GAS JOURNAL

LIGHT ·:· HEAT ·:· POWER

BYE-PRODUCTS.

Founded in 1849 as the "Journal of Gas Lighting."

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VOL. CLXXXVII. No. 3450.] WEDNESDAY, JULY 3, 1929 [81ST YEAR.

Editorial Notes.

Coal Buying and Future Possibilities.

THE Presidential Address of Mr. James Jamieson before the Waverley Association of Gas Managers last Friday—see later pages—contains many noteworthy features, to three of which we call particular attention. First, there is his insistence on the importance of the proper selection and wise purchase of coal for gas-making and coke production. It is not easy to come to a decision on this matter, for there are many conflicting elements in the process of carbonization which must be balanced in relation not only to the price at which coal may be purchased, and the amount of gas which it will make in a particular carbonizing system, but also to the condition of the residuals market at any one time, and the need for maintaining a supply of solid smokeless fuel of satisfactory and unvarying quality. Cheap coal is expensive if dearer coal would yield a better return from the setting in use. This, of course, is obvious; but the difficulty arises in arriving at a conclusion as to what is, and what is not, economical coal. Proximate analysis, even after skilled sampling—and no results are worth the paper they are written on unless the sample is representative—affords very little guide to the gas engineer. It allows of the valuation of the moisture content and the ash content, but it gives no clue as to how the volatile matter will be distributed in the products when the coal is carbonized. Hence, to evaluate a coal for gas manufacture and coke production, it is most desirable to set aside part of the plant for test purposes; and where this cannot be achieved, the smaller undertaking must seek advice of its larger neighbour. From the point of view of coal testing alone, amalgamation and joint working of gas concerns is of inestimable value. At present, where test plants are not available, different coals might well be carbonized in separate retorts, to ascertain if they are carrying their weight or if they are depending on others for inclusion in the blend.

Even to-day one often hears "thermal production per ton" used in comparing the efficiency of works and plant. Comparisons on this basis prove nothing; and this brings us to the second point of Mr. Jamieson's address which we desire to emphasize—that in immediate circumstances a gas undertaking should purchase its coal not necessarily because it will yield seventy, eighty, or ninety therms of gas per ton, but because it will give economically a reasonable gaseous thermal yield coupled with coke suitable for domestic or industrial purposes. A growing thermal yield looks pleasant enough in a yearly report. In itself, however, it means nothing whatever to the discerning engineer, though admittedly it may impress the lay mind. The popularity of gas coke for use in both hot-water boilers and open firegrates is increasing from day to day; so is competition from other solid smokeless fuels. To take an example from Mr. Jamieson's address, the estimated daily make of low-temperature fuel by the Bussey process at Glenboig—details of which were given in the "JOURNAL" for April 10, p. 100—is over 400 tons. This indicates clearly enough the importance of selecting coals for the dual production of gas and coke, and of employing efficient coal and coke handling methods. In the latter connection, Mr. Jamieson's remarks on coal breaking are of interest.

The third feature of the address concerns complete gasification, which to our mind is one of the gas industry's most valuable defences against possible, though perhaps improbable, contingencies. Regarding this subject, Mr. Jamieson suggests that, if one were certain that the conversion of the domestic consumer to smokeless solid fuel can be accomplished at the same rate as the production of the fuel is increased, the question would not be serious; but he doubts whether this will take place. Consequently—and without adopting a pessimistic attitude—one must be prepared. In other words, the study of complete gasification processes—including the development of any system likely to cheapen the production of oxygen—must not be shelved, whatever the present temptation. Closely related is the question of the enrichment of water gas by the catalytic synthesis of methane and other paraffins and olefines from carbon monoxide and hydrogen. Mr. Jamieson seems to have a liking for metal catalysts, such as nickel, though their use does not yet indicate a solution to the problem of finding an enricher for lean gas. In our opinion, unless a more satisfactory catalyst is found (one not readily poisoned by sulphur compounds), it may develop that a process employing higher pressures and oxide catalysts will be most satisfactory. "If (synthetic) processes could be perfected and applied on a commercial basis," observes Mr. Jamieson, "it would place the gas industry in a position unlikely to be challenged by any other source of heat and power." The possibilities of synthetic hydrocarbons as an enricher of town gas are fascinating. Presumably, enriched water gas made by the use of synthetic hydrocarbons will be free from gum-forming and resin-forming constituents, as well as from tar fog and naphthalene. Furthermore, it may be possible to change at will the calorific value of the mixture used to carburet water gas, and the specific gravity of the enriched gas can be maintained within limits such that it can be mixed in almost all proportions with coal gas. These and similar factors, such as the relative costs of equipment and constant-load operation, must be considered in evaluating synthetic hydrocarbons. It is possible that ultimately they will be worth more to the gas industry than is indicated by their fuel values.

A Notable Recovery.

As from January 1, 1910, the three Companies who had hitherto supplied Buenos Aires with gas—that is to say, the Primitiva Gas and Electric Lighting Company of Buenos Aires, the River Plate Gas Company, and the Buenos Aires (New) Gas Company—were amalgamated; and since then this important public duty has been in the hands of the Primitiva Gas Company of Buenos Aires, Ltd. For a brief span things went well, but then came the war, which upset so many calculations. Gas undertakings the world over suffered; but the disabilities which were so generally experienced appeared to settle in exaggerated form upon the Gas Company supplying Buenos Aires. Coal became hard, and afterwards practically impossible, to obtain; and difficulties of all sorts and magnitude cropped up. In this way, the Company entered into a time of trouble which was destined to endure until long after the war had passed away.

Faith in the undertaking was never really abandoned by those who realized the enormous potential value of the business which was in its hands; but things had undoubtedly got into a very bad condition. What was needed was hard, unsparing work; and this, happily, was forthcoming, with the result that the proceedings at last week's annual general meeting were such that the shareholders, as was expressed by one of them, "seemed to feel themselves almost in fairyland." Within a period of four years Mr. P. A. Cooper, the new Chairman (acting with an enthusiastic and eminently capable Board) has brought about a remarkable transformation. "We had," declared Mr. Cooper last week, "been called in to take over the management of your Company; and we had to exercise all our enthusiasm and all our determination to get it going again." The nature of this determination will be better judged when it is mentioned that, in addition to Mr. Cooper (who seems to spend a great part of his life in going to and fro between this country and South America) the Board included Mr. Frank H. Jones, Lord St. Davids, and Colonel H. Le Roy-Lewis. At the close of these four years the shares stand at nearly eight times the low figure to which they had fallen at the time when the new Board took control; and the Company is restored to the dividend-paying stage. For the present year the distribution, it is true, is at the rate of only 5 p.ct.; but that figure is not in the least likely to constitute for long the peak of the Board's accomplishment.

The business is growing with ever-increasing rapidity. Every effort is being made to bring all sections of the undertaking up to the highest standard; foundations are being laid for future expansion; and once more the price of gas has been slightly lowered. These are matters of policy, which must be noted with satisfaction by the shareholders. So also is the important agreement that has been entered into with the Company supplying electric light and power to Buenos Aires. This Company (referred to by the Chairman as the "C.H.A.D.E.") is one of a group controlled by the enormously powerful Société Financière de Transports et d'Entreprises Industrielles (the "Sofina"). The market capitalization of the "C.H.A.D.E." is £60,000,000, and that of the "Sofina" no less than £170,000,000; so that the Gas Company have secured powerful allies. A vital element in this alliance, however, is the retention by the present holders of the control of the gas undertaking; and to this end there has been formed a Holding Company into which the Primitiva shareholders will be asked to exchange their shares. The 660,000 shares sold to the "C.H.A.D.E." under the agreement and those placed with the Holding Company will then be handed over to two Trustees, whose duty it will be to use their votes to maintain British control and to prevent any prejudice of the interests of the "C.H.A.D.E."

In the matter of the working results, it will be noted that the unaccounted-for gas has been reduced; the volume of complaints—or "adjustments," as the Chairman prefers to call them—has fallen; and the control by the management is improving satisfactorily. In Buenos Aires, as in England, one of the features of the industry is the increasing interest in gas which is manifested by architects and builders. The shareholders of the Primitiva Gas Company have waited patiently, but they have not waited in vain. There is opening-up for them a vista of prosperity such as should prove ample recompense for the misfortunes of the past.

Watch the Maximum Consumption.

Only of recent years has the subject of ventilation as applied to the removal of products of combustion from gas appliances been studied with that close attention warranted by its great importance; and perhaps no problem could afford better and more convincing proof that sound theoretical conceptions are just as necessary as good and honest practical workmanship in the construction and installation of gas apparatus. Several timely and valuable investigations have of late been undertaken by the Joint Research Committee of the Institution of Gas Engineers and the University of Leeds, with Mr. J. W. Wood as Research Chemist. The question has also been tackled in whole-hearted fashion in the laboratories of the appliance manufacturers and of the larger gas undertakings. Particularly important in regard to the latter is the work undertaken by the Gas Light and Coke Company at Watson House, under the direction of Mr. J. G. Clark, who is well known to our readers both personally and through his interesting articles and papers published from time to time in the pages of the "Journal." Mr. Clark has a facile manner of expressing complicated thoughts by reducing them into simple language. This clarity is of the greatest value to gas men throughout the country; and the paper on ventilation—a problem to which he has devoted years of energy and ingenuity—which he read before the Midlands Circle last month will be of the utmost benefit.

Complete combustion, says Mr. Clark, is of the utmost importance in ventilation apart altogether from other questions, and to start with a good burner properly applied is more than half way to a complete solution of the problem of dealing with the products of combustion. In this connection, a fact which is not so fully recognized as it deserves is that every gas appliance has a maximum consumption which ought not to be exceeded. This point should be watched with great care in the installation of geysers. It has been emphasized before both by Mr. Clark and by Mr. Wood, but we have no trepidation in stressing it once again. As mentioned in the Twenty-First Report of the Joint Research Committee, which was presented at the Institution Meeting last month, among the causes tending towards carbon-monoxide production with the geyser are excessive gas rate for individual burners, and excessive velocity of air and products through the combustion chamber. It is part of the work at Watson House to determine desirable maxima for gas appliances, and a considerable amount of information has already been compiled. In this regard, fitters must never overlook the possibility of variation in pressure at the consumers' burners. In his paper before the Institution, Mr. F. G. Gorman, Deputy Engineer of the South Suburban Gas Company, referred to this matter. He observed that complaints of "insufficient pressure" are often caused not so much by too little pressure as by variation in pressure; the latter being too high when the demand is light, and too low when it is heavy. With the geyser, the fitter must watch his step when he is installing the appliance at a period of heavy demand.

Another cause tending to carbon-monoxide production in the geyser is smothering, due to the use of too short a length of primary fluepipe. The baffle—and no make of baffle ought to be employed unless it is proved to be satisfactory; there are badly designed baffles still on the market—should be positioned to ensure the longest primary flue possible. Mr. Clark's remarks on geyser fluepipes are most important. He says: "It is sometimes thought that a geyser installation that is defective on account of excessive and persistent downdraught can be improved by an extension of the secondary flue pipe. My own view is that this alone would go only a small way towards correcting the defect. The real solution lies in finding a better position for the terminal or a better type of terminal." Incidentally, he thinks

that the gas industry has no reason to be proud of some of the geyser terminals which deface the outside appearance of many houses.

A Thirteen Month Year.

WHILE keen interest continues to be maintained in the system of monthly accounts which has been adopted by the South Metropolitan and the South Suburban Gas Companies, yet another innovation affecting account keeping is being brought forward in the Press. The latter change is perhaps even more calculated than the monthly gas account system to require getting accustomed to; but there never has been a time when conditions have altered so rapidly and so deeply as they are doing now, and consequently the place in the scheme of things for industries that are not adaptable must tend to become more and more restricted. Many of us may prefer in some respects the old to the new, and yet the new may be essential to the securing of the best results in the circumstances of to-day.

But after all there is really nothing very startling about this new idea—at least, it will not startle those who, for instance, can recall riding on the "knife-board" of a horse-drawn omnibus, and who now "strap-hang" on the tube railways. It will, however, bring relief to those persons—and there must be myriads of them—who, when suddenly called upon to decide whether a particular month consists of thirty or thirty-one days, are in the habit of mentally reciting: "Thirty days hath September, "April, June, and November." Should the new system become general, there will be no need for such an aid; for in length each month will be precisely the same. A recent visitor to Canada has written to the "Daily Mail" giving the information that rapid progress is being made in the Dominion with the adoption by firms of the thirteen-month year, each month consisting of twenty-eight days.

According to this authority, hundreds of corporations and banks are now adopting the system in Canada and the United States. The Canadian Manufacturers' Association have endorsed the change, and have sent resolutions in its favour to the Canadian Government and the League of Nations. It is claimed—and the claim is easily understandable—that book-keeping is simplified by the introduction of four weeks to the month, and there is saving of time and labour. Firms who have adopted the system express satisfaction with it from every point of view; and evidence is being collected for the preparation of a comprehensive report.

Remembering the old saw about February alone having twenty-eight days, "and in leap year twenty-nine," and multiplying twenty-eight days by thirteen, we must confess to feeling a trifle mystified; and even the explanation that "the year must always begin on a Monday to fit the thirteen months' calendar" does not entirely dispel this uncertainty. Is there no other adjustment requiring to be made?

Wages and Conditions in the Gas Industry.

It must be regarded by all as satisfactory that the National Joint Industrial Council have once again been able to settle, on behalf of all those whom they represent, the question of wages and conditions of service for another year. Since the Council inaugurated the policy of national agreements in regard to these important matters there has been complete immunity from the differences of opinion and the disputes to which they are prone to gve rise; and there is no doubt that the new agreement will be carried out by both sides as loyally as its predecessors—thus ensuring a continuance of the happy relations between employer and worker which have for so long characterized, and contributed to the prosperity of, the gas industry.

Holborn Explosion Compensation.

The question of legal liability for the consequences of the disastrous explosion that took place in Holborn on Dec. 20 last, in circumstances which were set forth in the "JOURNAL" at the time (as well as in the course of the subsequent official inquiry, a full report of the proceedings at which we placed before our readers), is not after all to be settled in the Law Courts. An official announcement, in terms set forth on another page, indicates that the Postmaster-General and the Gas Light and Coke Company, while disclaiming any legal liability on their respective parts for the explosion, have come to an agreement under which they will pay, in equal shares, proper compensation to persons who suffered from the explosion losses which would otherwise have been legally recoverable. From all points of view, this appears to be a settlement upon which both parties are to be congratulated. Enormous sums in law costs have been saved, and the removal of a possible source of friction clears the way for the maintenance of those amicable relations which are essential to the best interests of persons or businesses working in contact with each other. There is still divergence of opinion as to the advisability of placing pipes and cables together in subways; but there can be no doubt as to the need for the closest co-operation between the various sub-soil users.

The Strange Case of Manchester.

A curious position of affairs is reported to have come about at Manchester, where the Gas Committee originally advertised for a Chief Engineer at a salary of £1500 a year, which figure the City Council subsequently decided should be raised to £2250, on the ground that the lower sum had failed to attract candidates who were regarded as suitable. Fresh applications at the higher salary were sought, but in the short list of candidates there was, "The Times" states, only one man who had not previously applied. He afterwards withdrew, so that the list consisted of the very same applicants who had previously been willing to accept £1500, and who were now being offered £2250. What should the Committee do? Should they appoint a man at £2250 per annum who had already signified his preparedness to accept £1500; should they appoint a man at £1500, after having confessed their willingness to pay £2250 a year for the work; or should they still further increase their offer, in the hope of securing some fresh candidates for the position who might be regarded by them as more suitable? This is the dilemma in which the Committee find themselves; and evidently some further time must elapse ere curiosity as to the filling of the appointment can be satisfied. It is understood that the matter will be brought up at the next meeting of the City Council, when it will be moved that the salary be again reduced or altered.

South Metropolitan Co-Partnership.

In later columns will be found the address which Dr. Charles Carpenter, C.B.E., the President of the South Metropolitan Gas Company, delivered on the occasion of the annual co-partnership festival of the Company which, attended by more than eight thousand people, took place last Saturday at the Crystal Palace. In the course of his remarks he referred to the remarkable attitude which the local authorities are taking up in regard to their tenants. By their restrictive covenants they say to them in effect "You may keep a tallow night light burning in your bedroom to quieten a restless child, but you must not use a gas light. You may go to bed yourself by candle light, but not by gas light. You may sit and enjoy your evening meal by the light of an oil lamp, but not the light of an incandescent gas burner." Government at one time encouraged competition as far as possible between one railway and another. To-day it prescribes amalgamation or rationalization. But in both cases the public is free when seeking the place for its pleasures, or travelling to and from its toils, to make its own choice of going either by road or rail. It has not yet been made a condition of living in a council-owned house that the tenants should be carried to and from their work in a municipally-owned tram; but undoubtedly such a condition of house tenancy will before long be imposed, and the weekly rent will not be receipted by the collector unless there is produced at the same time a set of duly punched tramcar tickets.

Gas in Industry.

Seldom has a meeting of industrial gas salesmen been attended with such success, and marked with such benefit, as last Friday's gathering in London of the British Commercial

Gas Association Industrial Salesmen's Circle. A full account of the meeting will be published in the next issue of the "GAS SALESMAN," and in later columns of the "JOURNAL" to-day will be found a brief résumé of Friday's proceedings. During the morning the Gas Light and Coke Company's Industrial Showrooms at Goswell Road (where so much excellent work is being accomplished to the benefit of the entire industry) and the premises of the "Daily Mirror" were inspected; and the information gained by the members of the Circle is bound to be of great service in furthering the use of gas in industry. Following luncheon, a business meeting was held in the Cannon Street Hotel during the afternoon, under the Chairmanship of Mr. Stephen Lacey, the Distribution Engineer and Deputy-Controller of Gas Sales to the Gas Light and Coke Company. Two papers were presented—one by Mr. J. Ennals, on the uses of gas by the printing trade, and one by Mr. T. V. Garrud, on the question of competition. The discussion which these contributions evoked was remarkable for both its keenness and its value, for all who joined in it had something interesting to impart.

Good News for Motorists.

There has been announced, to take effect as from the beginning of this week, a reduction by the National Benzole Company, Ltd., of 1d. per gallon in the price of "National" benzole mixture. The wholesale and retail price of "National" motor benzole has also been reduced by 2d. per gallon. The Company point out that the production of benzole at the present moment is higher than it has been for some time, and that, as this production is to a great degree governed by the state of prosperity of the heavy industries of the country, the increased output is an indication that the trading conditions of the coal, iron, and steel industries are steadily improving. The Anglo-American Oil Company have also announced similar reductions in the prices of benzole and benzole mixture.

PERSONAL.

The Directors of the British Gas Light Company, Ltd., have appointed Mr. CECIL RHODES ARMITAGE to be Engineer and Manager of their Norwich Station, in succession to Mr. Thomas Glover, whose resignation was referred to in our last issue. Mr. Armitage has been in the service of the Company for ten years, and was for some time Engineer and Manager at the Company's Potteries Station. When that undertaking was acquired in 1922 by the Stoke-on-Trent Corporation, in connection with the scheme for the centralization of gas manufacture in the Potteries, his services were retained by the Company, and he was subsequently transferred to the London Office, where he has been employed in an advisory capacity and in superintending a number of the Company's undertakings. In announcing Mr. Armitage's appointment the Directors of the Company state that they consider they are fortunate in having already in their service an Engineer so eminently qualified to take charge of their Norwich Station and maintain the high tradition and efficiency associated with Mr. Glover's management.

The Directors of the Gas Light and Coke Company have renewed for a second year, commencing Oct. 1 next, the appointment of Mr. SAMUEL G. HILL, B.Sc., A.R.C.S., to the Company's Gas Research Fellowship at the Imperial College of Science and Technology.

Mr. ROY C. L. FULLER has been elected a Director of the Bath Gas Company to fill the vacancy caused by the death of Sir Percy K. Stothert.

Mr. Walter Kidde, Chairman of the Board of Trustees of the Stevens Institute of Technology, has announced the election of Mr. ARTHUR GRAHAM GLASGOW to be a life Trustee of the College. Mr. Glasgow is Chairman of the firm of Humphreys & Glasgow, Ltd. A year ago he received the Walton Clark Medal of the Franklin Institute for outstanding and valuable work in the technology and development of the manufactured gas industry. He also received from the Stevens Institute in 1928 the Honorary Degree of Doctor of Engineering. Mr. Glasgow was born in Buchanan, Virginia, in 1865, and at the age of twenty he graduated from the Stevens Institute with the Degree of Mechanical Engineer. Upon graduation he entered the employ of the United Gas Improvement Company of Philadelphia, and in 1891 he became General Manager and Chief Engineer of the Standard Gas Light Company of New York, later part of the Consolidated Gas Company. As junior partner in the firm of Humphreys & Glasgow, he entered, in 1892, into business association with the late President Alexander Crombie Humphreys, of the Stevens Institute, acting as Manager of the European Offices of the firm in London and Brussels. In 1909 the partnership was dissolved, and Mr. Glasgow became Chairman of the English Company, retaining the name of Humphreys & Glasgow, Ltd. Mr. Glasgow has been interested in the establishment, at the Stevens Institute, of the Alexander Crombie Humphreys Chair of Economics of Engineering, in memory of his late partner, who was for twenty-five years President of the College. In partial endowment of this professorship, gifts amounting to $50,000, including $25,000 from Mr. Glasgow, have been announced from time to time by President Harvey N. Davis. In the Board of Trustees of the Stevens Institute Mr. Glasgow succeeds Dr. Henry Suzzallo.

OBITUARY.

DR. RUDOLPH GEIPERT.

The German gas industry has sustained a heavy loss by the sudden death, from appendicitis, of Dr. Rudolph Geipert. His name is well known through his many contributions to the chemical side of gas manufacture; and Herr Ernst Körting sends us the following appreciation of his colleague, whom he considered "one of the ablest scientific carbonizers in Germany."

After completion of his studies, Dr. Geipert was first appointed science assistant to Drs. Bunte and Haber, after which he spent a few years in the aluminium industry. It was in 1906 that he entered the service of the Imperial Continental Gas Association, as Chemist at the Berlin Works. Here he was able, with more important results year by year, to devote himself to the principal technical task which the Company had set itself of developing verticals of the Dessau type on the lines of heat economics, and exploring their practical possibilities. In other directions, he devoted himself to the questions of coal evaluation and analysis, gas purification, and the theory and practice of the water gas process, and all with such success as is only possible to one who combines sound theoretical principles with a clear grasp of practical propositions. His industry and his achievements are testified by numerous papers and contributions to technical literature, but still more, if not so obviously, by the technical and economic results year by year of the Company he served.

As a man, Dr. Geipert threw himself wholeheartedly into the *esprit de corps* fostered by the Imperial Continental Gas Association and its successor in Berlin, and devoted himself without stint to the interests of the firm. With his colleagues and his chiefs he was thus bound by the finest ties of work for the common good, of mutual understanding, and of affection, in which, in the course of many long years, there was never a break.

The death has taken place of Mr. ARTHUR FINDLOW, of Biddulph, North Staffs., at the age of sixty years. Mr. Findlow was a member of the local Council at the time the gas undertaking was purchased by the Council from a private company. He took a deep interest in the undertaking and was for a lengthy period Chairman of the Gas Committee.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

July 5.—MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.—Visit to the Halifax Gas-Works and to the Works of Messrs. Drakes, Ltd.

July 9.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board.

Aug. 13-14.—IRISH ASSOCIATION OF GAS MANAGERS.—Meeting in Dublin.

Sept. 12.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual Meeting at St. Andrews.

Sept. 19.—WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.—General Meeting at Porthcawl.

The Smoke Curse.—Prof. Leonard Hill, M.B., F.R.S., in a lecture delivered to the Medical Officers of Health Conference of the Royal Sanitary Institute at Newcastle-on-Tyne, spoke of the dirt, disease, and damage to buildings incurred by the burning of raw coal. About 50 p.ct. of the lost time in workshops and offices is caused by respiratory diseases brought on by atmospheric pollution. The money wasted annually through the smoke nuisance is enormous. Prof. Hill urged the utilization, to the utmost, both in home and in factory, of smokeless fuels—electricity, gas, and smokeless solid fuels. By such means the health, wealth, and happiness of the nation will, he said, be materially increased.

20-TON RAILWAY WAGONS.

A Vital Consideration in the Question.

By WALTER T. DUNN, M.I.Mech.E.

Among the important questions of great public interest at the moment, probably none is of more pressing insistence in the interests of the country's commercial prosperity than that of the modernization of our British Railways—the Great Four.

The purpose of the writer of this article is to utter a word of warning to those reforming enthusiasts who are crying aloud "Scrap all the existing privately-owned 10 and 12 ton capacity trucks; build 20-ton trucks to replace them, and so reduce your transport charges."

As Secretary, for more than thirty-two years, of the Institution of Gas Engineers, the writer's duties have brought him into intimate contact with all the engineers and general managers of the great gas manufacturing undertakings of Great Britain, and, indeed, of the whole world. He has also, in the same capacity, made contact with the leading manufacturers of the plant and of the appliances which are needed in carrying out the processes incidental to the transport, handling, and carbonization of coal. Carbonization plant, the aggregate value of which runs into millions of money, has been specially designed and installed at the gas-works throughout the country; and no less than 20 million tons of coal are annually required to meet the demands of the British gas industry. To effect the carbonization of this coal, there are horizontal and vertical retorts in operation. The coal-receiving section of these carbonizing plants has, of course, been designed in relation to the construction of the trucks which bring the coal from the mines to the gas-works. Most of the privately-owned coal trucks, of which there are thousands in use on our great railway system, have three methods of discharge of their contents—viz., bottom, side, and end. The introduction of the large-capacity truck of 20 tons would present serious difficulties to the gas engineer, who, it must be remembered, is primarily responsible for the running of his works successfully under regulations imposed by statute of Parliament. It would involve extensive and expensive alterations to the existing gas-works coal-receiving appliances to provide for the accommodation of the larger wagons—indeed, in some cases re-design of the coal-receiving and elevating plant—and serious reconstruction work would have to be carried out. To accomplish this, the carbonizing plant might have to be temporarily thrown out of action while the work was being executed; and the continuous supply of gas to the community would thereby be jeopardized.

Another vital practical question which arises is that of the actual time of delivery of coal to the gas-works. Under the present accepted system of tendering, the coal owners agree to deliver a certain proportion of the ordered coal at intervals over a specified period, to meet the convenience of the gas undertakings. The whole quantity contracted for is not delivered all at once. This system possesses the advantage to the gas undertakings concerned of permitting them to provide a lesser space for coal storage than would be otherwise required. In some towns the area occupied by the gas-works is already inadequate, owing to the continually increasing popularity of gas for lighting, heating, and power, and the consequent necessity of space for new manufacturing plant to meet the demands of the public.

The coal factors and owners use their own trucks, and also those of their customers, as store receptacles for coal not immediately required for carbonization treatment at the gas-works. The introduction of the 20-ton trucks would, of course, advantageously diminish the extent of railway sidings which would be occupied by coal-containing trucks; but the circumstance of the coal-receiving appliances at the gas-works not having been designed in relation to that size of truck, but in relation to the smaller-sized truck, remains the *bête noire* of the situation.

The ardent railway modernization enthusiast should therefore pause to reflect upon all the practical issues of the admittedly pressing question of truck capacity before summarily ordering the scrapping of all the existing wagons.

GAS STOCK AND SHARE MARKET.

[For Stock and Share List, see later page.]

WITH the exception of a few foreign stocks in which there were special points of interest, there was hardly a redeeming feature on the Stock Exchange last week. Monetary developments again exerted a depressing influence, which spread from the investment section to the various speculative departments. Selling was on a fairly substantial scale, and prices moved against holders day by day. Of the leading stocks, Funding Loan and short-dated Treasury bonds were most affected.

It could not be expected that the Gas Market would escape the prevailing dulness. It will be seen by the list that the changes in the quotations were much more numerous than is usual, and all were on the downward grade. Eliminating the *ex* div. reductions, the most noticeable changes were a further fall in Imperial Continental of 20 points to 360-380, a drop of 4½d. to 19s. 3d.—19s. 9d. in the Gas Light (£1) stock, and a fall of 6d. to 16s. 9d.—17s. 3d. in the Newcastle (£1) stock.

The announcement by the Chairman at the meeting of the Primitiva Company that they had sold a large parcel of shares to the "Chade" electrical concern, and that it is proposed to form a Holding Company into which the shareholders will be asked to exchange their shares, is of great interest. It is an unusual procedure in the Gas Market; and the object, of course, is to counteract a possibility of a controlling interest being acquired by an outside group. So far the market price of the shares has not been materially affected.

The following transactions were recorded during the week:

MONDAY.—Aldershot "C" 70½, Alliance and Dublin 97½, British Gas Light 5 p.ct. deb. 96½, Commercial 98, Gas Light and Coke 19s. 6d., 19s. 7½d., 3½ p.ct. max. 63⅞, 4 p.ct pref. 77⅜, 77⅞, Imperial Continental 375, 376, 378, 380, 382, 385, Maidstone 5 p.ct. 125, 127, Primitiva 37s., 37s. 3d., 37s. 6d., 37s. 7½d., 37s. 9d., 37s. 10½d., 38s., South Metropolitan 105½. Supplementary prices, Brighton and Hove 4 p.ct. deb. 75, 5 p.ct. deb. 96, Eastbourne "A" 120, Montevideo new 1s. 6d., 1s. 9d. pm.

TUESDAY.—Brighton and Hove 5 p.ct. 100½, British 5 p.ct. 97½, Commercial 3 p.ct. deb. 57, Gas Light and Coke 19s. 6d., 19s. 7½d., 19s. 9d., 19s. 9¾d., 4 p.ct. pref. 78, 3 p.ct. deb. 59½, 60½, 5 p.ct. deb. 99¾, Imperial Continental 375, 377, 379, 380, 381, 382, Newcastle 3½ p.ct. 17s. 3d., Primitiva 36s. 6d., 37s., 37s. 3d., 37s. 4½d., 37s. 6d., 37s. 7½d., 37s. 9d., 38s., 38s. 1½d., South Metropolitan 104⅜, 104⅝, 105, 105½, 6 p.ct. pref. 109, 109½, 6½ p.ct. deb. 100⅝, 101, Tottenham 3½ p.ct. 108, Uxbridge 5 p.ct. pref. 90, Wandsworth 5 p.ct. deb. 95. Supplementary prices, Brighton and Hove 4 p.ct. deb. 76, Eastbourne "A" 122, Hornsey new 5 p.ct. pref. 90.

WEDNESDAY.—Bournemouth 6 p.ct. pref. 11⅛, Cape Town 9, 9½, Commercial 3 p.ct. deb. 57¼, European 17¼, Gas Light and Coke 19s. 4½d., 19s. 6d., 19s. 7½d., 4 p.ct. pref. 77, 3 p.ct. deb. 59½, 60½, 5 p.ct. deb. 99⅜, Imperial Continental 370, 372, 375, 375½, 376, Primitiva 35s., 35s. 3d., 35s. 6d., 35s. 9d., 36s., 36s. 3d., 36s. 6d., 36s. 9d., 37s., 37s. 3d., South Metropolitan 104½, 6 p.ct. pref. 110, 3 p.ct. deb. 58½, 6½ p.ct. deb. 101.

THURSDAY.—Alliance and Dublin 96, Bournemouth 4 p.ct. deb. 76, 76½, Commercial 97¼, 3 p.ct. deb. 57⅜, European 17, Gas Light and Coke 19s. 3d., 19s. 4½d., 19s. 5¼d., 19s. 6d., 3½ p.ct. max. 63, 3 p.ct. deb. 59⅜, 5 p.ct. deb. 99, 99⅜, Imperial Continental 360, 363, 365, 368, 370, 372, Primitiva 33s. 3d., 33s. 9d., 34s., 34s. 3d., 34s. 6d., 34s. 9d., 35s., 35s. 9d., 4 p.ct. con. deb. 79, 80 *ex* div., South Metropolitan 104, 104½, 104¾, 105, 105½, 3 p.ct. deb. 59⅜, Wandsworth new 103, 103½. Supplementary prices, Associated Gas and Electric shares class "A" $55, Walton-on-Thames "A" 14⅞.

FRIDAY.—British 118, 118⅜, 118⅞, Gas Light and Coke 19s. 3d., 19s. 6d., 19s. 9d., 4 p.ct. pref. 76¾, Imperial Continental 365, 366, 367, 370, 372, 373, 375, Primitiva 34s. 6d., 34s. 9d., 35s., 35s. 3d., 35s. 6d., 35s. 9d., 35s. 10½d., 36s., 36s. 3d., 36s. 6d,, 36s. 9d., 37s., 37s. 3d., 37s. 6d., South Metropolitan 6 p.ct. pref. 110½, 6½ p.ct. deb. 101½, Southampton 5 p.ct. 79. Supplementary prices, Preston "A" 132½, South Suburban 7 p.ct. deb. 98.

With the end of the half-year requirements money was in strong demand in Lombard Street towards the close of last week. Week-end accommodation commanded from 6 p.ct. to 6¼ p.ct., but overnight advances on Friday were offered at 4 p.ct., and finally at as low as 3½ p.ct. Treasury Bills were allotted at an average of £5 8s. 0·75d. p.ct., being 1s. 2·66d. p.ct. above the previous week's rate.

Both the dollar and the mark exchanges were disappointing; the former finishing at 4.84⅞, and the latter at 20.34½. French francs continued in demand, closing at 123.87½; Dutch florins closed at 12.07⅞; Italian lire at 92.65; and Spanish pesetas at 34.25.

The Bank Rate is 5½ p.ct., to which it was raised from 4½ p.ct. on Feb. 7. The Banks' deposit rate is 3½ p.ct., and the deposit rate of the Discount Houses is 3½ p.ct. at call.

UNION SYNDICALE DE L'INDUSTRIE DU GAZ EN FRANCE.

52nd Annual Meeting, Rouen, June 17-21.

Paris alternates with the great provincial centres as the venue of the Annual Congress of the French Gas Industry; and this year Rouen, the magnificent port of Normandy, with its population of 120,000, entertained a large number of the members of the Union Syndicale and delegates from the sister Associations of other countries.

M. ROBERT ELLISSEN,

President of the Union Syndicale.

As usual, the Monday afternoon and Tuesday morning were devoted to preliminary business; and the first session, on Tuesday afternoon, to the distribution of the Government long-service awards. M. Robert Ellissen, President of the Union Syndicale, was in the Chair, supported by M. Baril, President, and several Past-Presidents of the Association Technique. Great Britain was represented by Mr. Charles S. Shapley, President of the Institution of Gas Engineers, and Mr. Walter Dunn. Mr. Frank Jones was there, too, in the dual capacity of President of the "B.C.G.A." and Vice-Chairman of the European Gas Company. Mr. E. J. Fottrell represented the National Gas Council. Dr. Schütte had come on from his strenuous duties in Berlin.

After the session, automobiles conveyed the members and visitors to the well-conditioned works of the European Gas Company and of the French Gas Company, who share the duty of keeping Rouen supplied with an adequate volume of gas of the right quality and composition. In the evening, the official banquet of the industry was held at the Hôtel de France, when about four hundred sat down. M. Ellissen occupied the Chair, and he was supported by the Prefect of Seine Inférieure; the Deputy-Mayor of Rouen; Mr. Frank Jones; the Presidents of the British, German, and Swiss Gas Associations; M. de la Paulle, Past-President of the Belgian Association, with M. Timmermans; M. Keclik, of Czecho-Slovakia; Mr. Fottrell; and Mr. Dunn.

On Wednesday morning M. Baril called the conference to order about 8.30 for the report on the best communications presented at the 1928 Congress. We are pleased to record that the vote and first prize went to our friend M. A. Bolzinger for his paper on the "Influence of Temperature and Pressure in Carbonization;" second prizes being awarded to MM. Gros and Mineur. Hearty acclamation greeted the announcement that the Society's Gold Medal had been awarded to M. Henri Laurain for his invaluable services to the French Gas Industry. Then followed the Reports of Committees. That on "Popularizing Gas" contained a statement as to the results of the tests of the apparatus and appliances which had been entered for the Exhibition which had been arranged for the Congress. It was gratifying to notice that Messrs. Radiation Ltd. had been awarded four Diplomas and a prize of 2000 francs. Abstracts from the Reports and some of the sixteen papers which were presented will be published in future issues of the "Journal."

A brilliant function took place on Wednesday evening, when, by invitation of the two Gas Companies, a banquet took place at the Grand Hôtel de la Poste. The President of the Compagnie d'Eclairage par le Gaz de la Ville de Rouen occupied the Chair, with Mr. Frank Jones, Vice-Chairman of the Compagnie Européenne du Gaz, *vis à vis*. At Thursday's gatherings the reading of the remainder of the papers was completed, after which the Annual Meeting of the Society for Developing the Uses of Gas took place. This new organization has for its model our British Commercial Gas Association, and there is no doubt that during the short period of its existence it has done very well. Great things are expected from its operations.

On Thursday evening there was a gala performance at the theatre, the entire accommodation in which had been booked for the delegates and for the Gas Companies' employees and their families. The whole of Friday was devoted to a delightful river and automobile excursion; and at déjeuner the two Companies again joined as hosts. At its conclusion, the hearty thanks of the participants were voiced by M. Ellissen, and Mr. F. Eliot Williams, General Manager of the European Gas Company, made acknowledgment.

WAVERLEY ASSOCIATION OF GAS MANAGERS.

Annual Meeting in Edinburgh.

The Annual General Meeting of the Waverley Association of Gas Managers was held in the Goold Hall, Edinburgh, on Friday, June 28. The President, Mr. James Jamieson, Assistant Engineer and Manager, Corporation Gas-Works, Edinburgh, occupied the Chair, and was accompanied to the platform by the immediate Past-President (Mr. G. Urquhart, of Tranent), and by Mr. R. J. Philp, the Hon. Secretary and Treasurer (Gas-Works, North Berwick).

The minutes of the last annual general meeting held in Peebles were adopted on the motion of Mr. A. Dow, of Galashiels.

Annual Accounts.

The abstract statement of accounts for the year ended April 30 showed the income to be £156. After meeting the necessary outlays, the balance-sheet disclosed a substantial credit, including £100 5 p.ct. War Stock,

Mr. R. W. Cowie (Hawick) moved the adoption of the accounts. He suggested that the Association could congratulate themselves on the sound financial position in which they were now placed. Much of the credit was due to the efficient and capable way in which Mr. Philp carried on his duties as Secretary and Treasurer. He moved a resolution that Mr. Philp should be voted from the credit balance an honorarium of ten guineas, as an indication that his work on behalf of the Waverley Association was appreciated.

The report was unanimously adopted, and a vote of thanks was passed to Mr. John O'Halloran for his services as Auditor.

The President said that before the close of the meeting the members would have an opportunity of discussing the point raised by Mr. Cowie for an honorarium to the Secretary and Treasurer.

New Members.

The following were thereafter admitted to the membership roll: Ordinary Members—Messrs. H. G. Ritchie, Falkirk; R. A. Harvey, Lockerbie; R. L. Laing, Brechin; J. Robertson, Cardenden; and A. C. Watson, Newton Stewart. Extraordinary Members—Messrs. James Moffat, Glasgow; B. W. Fowler, Rosyth; W. L. Burns, of Messrs. Henry Balfour & Co., Leven; and E. G. Elliott, of the Davis Gas Stove Company, Ltd., Luton.

Revised Rules and Regulations.

The revised rules and regulations as drafted by a Committee were unanimously approved by the Association.

The President explained that the Committee had that forenoon given further consideration to the rules and regulations,

and Mr. Dow had made a small alteration in one of the by-laws, which it was thought would be an added advantage.

The by-laws as amended and as circulated in the draft copies to the members were unanimously confirmed.

THE NEW PRESIDENT.

The PRESIDENT said it now fell to the members to elect the new President of the Association for the year 1929-30. The Council, he explained, had given the matter consideration, and ha ddecided to come forward with the unanimous recommendation that Mr. David Vass, of Perth, should be elected. Mr. Vass needed no introduction to them, as he was one of the oldest members of the Association. He joined in 1887, and was President in the year 1894-95.

Mr. Dow formally seconded the election of Mr. Vass to the Presidential Chair.

Mr. Vass, acknowledging his election, said he considered it a very high honour indeed to be elected for the second term as President of the Waverley Association. He assured them that he had always had the interests of the Waverley Association deeply at heart.

OTHER APPOINTMENTS.

Mr. Philp was unanimously re-elected as Secretary and Treasurer, while Messrs. C. Hamilton (Loanhead) and A. McDonald (Prestonpans) were nominated for two vacancies in the Council of the Association. It was pointed out that Messrs. Hamilton and McDonald would hold office on the Council for two years.

PRESIDENTIAL ADDRESS.

At this stage in the proceedings Mr. JAMES JAMIESON delivered his Presidential Address. This is published separately in this issue of the "JOURNAL."

PRESENTATION OF MEDAL.

Before separating, the PAST-PRESIDENT (Mr. Urquhart, of Tranent) presented Mr. Jamieson with the Gold Medal of the Association.

Mr. JAMIESON acknowledged the presentation.

HONORARIUM TO SECRETARY.

Mr. COWIE again reverted to his proposal for an honorarium to the Secretary.

The meeting unanimously approved of the motion to award Mr. Philp an honorarium of ten guineas.

THE COMMERCIAL SECTION.

Mr. Cowie expressed the hope that the President and the members of the Council would shortly endeavour to arrange for a meeting of the Commercial Section of the Association in some suitable centre like Melrose. If a meeting could be convened for September, it might prove advantageous.

THE SOCIAL SIDE.

At the close of the annual meeting the members of the Association enjoyed a round of social pleasures. Luncheon was partaken of in Messrs. Ferguson & Forrester's Restaurant in Princes Street. Thereafter some of the members and visitors engaged in a golf competition over the Baberton Course, while another group took part in a bowling competition on the green of the Northern Club. Mr. J. D. Scott, of Messrs. Alder & Mackay, Ltd., Edinburgh, made the necessary secretarial arrangements for the golf competition, while Mr. Philp superintended the arrangements for the bowls.

GAS IN INDUSTRY.

Meeting of the "B.C.G.A." Industrial Salesmen's Circle.

Members of the Industrial Salesmen's Circle enjoyed an excellent meeting on Friday last in London. The morning was devoted to the inspection of the Industrial Showrooms of the Gas Light and Coke Company in Goswell Road, and of the extensive gas installation at the premises of the "Daily Mirror." Both inspections proved of great interest. At Goswell Road the visitors were able to see what the Gas Light and Coke Company are doing to improve the efficiency of industrial gas appliances. The Company's aim is to-co-operate with the manufacturers of apparatus, in order to effect general improvement which will benefit the whole gas industry. They are tackling problems not merely from the viewpoint of gaseous thermal efficiency of particular burners, and so on, but from the broader basis of commercial efficiency. Alteration in the construction of the actual pans used for fish frying is a case in point. By increasing the effective surface area of the pans, the gas consumption for fish-frying has been reduced to a remarkable extent; and the information which is being gained at Goswell Road is given freely to the manufacturers of apparatus, with the one proviso that no one firm shall take out patents to the detriment of other firms and of the gas industry. This broadcasting of practical research is highly to be commended.

At the premises of the "Daily Mirror" in Fetter Lane, those who attended the meeting—and there were representatives from as far north as Newcastle and Sunderland, and also from Wales—appreciated how greatly the speed and accuracy of gas can assist in the production of a newspaper. Apart from these two characteristics, however, gas possesses another paramount advantage—that of reliability. The installation of meters at the "Daily Mirror" is, to make security doubly secure, duplicated; so that in the unlikely event of failure of one supply (due, presumably to the entire upheaval of a street, or to an earthquake), there is always a stand-by, connected to a different main. Regarding the gas appliances at the "Daily Mirror," we will say nothing more here, as a full account of the proceeding of the meeting will be published in the next issue of the "GAS SALESMAN."

Following luncheon at the Cannon Street Hotel, a business meeting was held, at which Mr. Stephen Lacey, the Distribution Engineer and Deputy Sales Controller to the Gas Light and Coke Company, presided. Supporting him were Mr. J. C. Walker, the Secretary of the British Commercial Gas Association, and Messrs. H. H. Creasey (Gas Light and Coke Company), C. F. Barrow (Chairman of the Association of Gas Salesmen: Northern Area), E. A. Leask (Chairman of the West Riding of Yorkshire Circle), and E. L. Oughton (ex-Chairman of the Southern District—London Area—Circle).

Two papers were contributed to the meeting; one by Mr. J. Ennals, of the Gas Light and Coke Company, on the use of gas in the printing industry, with particular reference to the "Daily Mirror" installation, and the other by Mr. Garrud, also of the Gas Light and Coke Company, on the subject of gas in competition with other sources of heat and power in the industrial field.

To sum up, there can be no question that last Friday's meeting of the Industrial Salesmen's Circle was in every respect remarkably useful. On no previous occasion can we recollect a brighter and more beneficial discussion. All who joined in the discussion had something valuable to impart, and every member gained useful information from each visit. The vote of thanks proposed by Mr. Walker to the Gas Light and Coke Company, the "Daily Mirror," Mr. Stephen Lacey, and the readers of the papers was warmly accorded.

Motor Fuel from Coal.—A recent issue of the "Petroleum Times" mentions that the proceedings and the papers read at the Second Bituminous Coal Conference held at Pittsburgh, U.S.A., last November, have now become available in volume form, so that it is possible to study the papers in detail. This, however, is a matter of time, because of their great number, but even a hurried glance through the volumes is sufficient to show their wealth of material, dealing as they do with so many phases of the present and future utilization of coal. Among the papers which strike a new note in coal economy is one entitled "New Aspects of Coal Economy," by Dr. Jacobus G. Aerts, Director of the Private Institute of Technology, Dongon, Holland. This is a very long paper, divided into a number of sections. On the first section, on "Coal as a Direct Fuel," there is no need to comment; in the second section, on "Coal Distillation at Low Temperature," the author gives reasons to show that this is impossible as a general system, at the best yielding a household fuel, and this not in an ideal way. A section on the "Ammonia Problem" shows that the ammonia recovery in coal distillation might be greatly increased by new methods. A section on "Solid Coke by Low-Temperature Distillation" shows how all the advantages of low-temperature distillation might be obtained and still a solid compact coke obtained. A section on "Motor Coal *v.* Steam Coal" introduces some interesting matter. In the first place, the author estimates the annual world consumption of coal in producing steam at 500,000,000 tons, and believes that the principal economies in the use of coal in the future will be possible in this field. The author questions whether the motor fuel which contains the most hydrogen is the best fuel, and whether hydrogenation of coal is necessary to manufacture an ideal motor fuel from coal.

NEW OFFICES AND SHOWROOMS AT WEMBLEY.

Gas Light and Coke Company's Latest Enterprise.

New offices and showrooms of the Gas Light and Coke Company recently erected at 152-154, High Road, Wembley, were officially opened on June 24. These premises supplant less adequate ones farther up the same road, and will enable the Company more satisfactorily to cope with the great expansion of their business in this rapidly growing district, in which there are some 10,000 consumers.

This centre originally belonged to the Brentford Gas Company, but since it was taken over by the present Company there has been such a rapid growth of population, and a consequent increased demand for gas fittings and appliances, that the need for this enlargement of the Company's means for serving the public in the district has become urgent. One of the outstanding features in the growth of the district is that during the past two years 2500 new houses have been built, and over 3000 houses are in the course of erection, with more to follow. Some of the houses will be "all-gas," but in every case gas will be used for some or all of the purposes to which it can be applied in the home.

At the new showrooms the public will find a good selection of up-to-date artistic lighting fittings and shades; gas fires suited to every style of furnishing and decoration; efficient gas cooking appliances; gas geysers and hot water circulators, wash-coppers, irons, gas refrigerators, and other domestic and industrial labour-saving appliances. There also consumers will be able to make their inquiries; obtain advice upon the economical use of gas for any purpose, domestic or industrial; lodge their complaints, if any; and pay their bills. It is the established policy of the Company to assist their consumers in every possible way to secure the greatest possible value for the gas for which they pay, and to give them such good service as will secure their full satisfaction; and the opening of this new "service centre" is another step in that direction.

OPENING CEREMONY.

The official opening ceremony was performed by Major ISIDORE SALMON, C.B.E., D.L., M.P., who was accompanied by Mrs. Salmon, and supported by members and the principal officers of the Wembley Urban District Council, and many prominent residents in the district.

The visitors were welcomed by Sir DAVID MILNE-WATSON, LL.D., D.L., the Governor of the Gas Light and Coke Company. With the Directors there were the General Manager of the Company (Mr. R. W. Foot), the Chief Engineer (Mr. T. Hardie), the Secretary (Mr. W. L. Galbraith), the Superintendent of the Rental Department (Mr. L. M. Simmons), the Chief Officer of Stores (Mr. W. McDowall), the Controller of Gas Sales (Mr. F. W. Goodenough), the Deputy Controller of Gas Sales (Mr. Stephen Lacey), Mr. E. S. Boswell (the Inspector-in-Charge), together with other Senior Officers of the Gas Sales Department, to which is entrusted the task of giving good service to the 1,500,000 consumers in the Company's area.

The visitors were then entertained at tea at the kind invitation of the Governor and Directors of the Company; Sir DAVID MILNE-WATSON presiding. Before tea, a bouquet was presented to Mrs. Salmon by Miss Marie Penrose King, daughter of the Acting Foreman of the District Office Staff.

After tea,

Sir DAVID MILNE-WATSON said that they were there on a very pleasant occasion for the official opening of these new premises at Wembley. The Gas Light and Coke Company were carrying on the work of the old Brentford Company, but it was now necessary to reach an even higher standard, and so the Directors had decided to build these new premises, in order that the uses of gas might be demonstrated in the best possible way in such a growing and progressive district as Wembley. They had asked that distinguished architect, Mr. Walter Tapper, A.R.A., in collaboration with Mr. H. Austen Hall, to design the buildings, and the result was not only efficiency, but beauty. Sir David went on to say that he was very pleased indeed to have Major Isidore Salmon and Mrs. Salmon there to open the showrooms. He knew Major Salmon very well, and also the work he did for the district. Referring to the great extent of the Company at the present time, Sir David said that their area now stretched from Epping Forest nearly to Southend, and in the other direction as far as Windsor.

But, with all this vast area, he went on, they could do very little without showrooms such as these to keep the uses of gas before the public eye. They hoped that these new premises would serve a really useful purpose and offer greater facilities to their customers. In conclusion, he spoke briefly of the great work the gas industry was doing towards the abolition of the smoke nuisance. The results already achieved, he observed, were obvious when one came to compare the atmosphere of the large cities with that twenty-five years ago. There were far fewer fogs, and altogether the air was much purer than it used to be. Sir David then called upon Major Isidore Salmon formally to declare the premises open.

Major ISIDORE SALMON said that there was more than one reason for his being there on that occasion. In the first place he was Member of Parliament for that Division. He was very pleased to see that the Gas Light and Coke Company had built these new showrooms and offices, where the consumers would have so much better an opportunity of choosing the most suitable gas appliances. He felt that the Governor was right in his remarks regarding the value of these showrooms. The great number of them scattered all over London proved that the Company's policy was one of consideration for the wants of their customers. He was pleased to be present for another reason in that he was the Chairman of the Gas Light and Coke Company's largest customer [Major Salmon is Chairman of Messrs. J. Lyons & Co., Ltd.], and in that capacity he could vouch for the very real efficiency of the Company, which was an example to all the industries of this country, and of the utmost service to the nation at large. Major Salmon went on to refer to Sir David's work as representative of the British employers at the International Labour Conference at Geneva twelve months ago, and paid tribute to the great work which he had done in connection with the well-known Mond-Turner Conference. He was charmed, he continued, with these premises, which reflected the greatest credit on the Directors. By these means they were able to carry on the retail side of the business. He also paid tribute to the research work undertaken by the Company, particularly in connection with the investigations regarding the low-temperature carbonization of coal. He also spoke of the great good the manufacturers of gas were doing to ensure clearer air, while they were also contributors to the happiness of the home in providing many labour-saving appliances for the housewife. The appliances they introduced were most satisfactory, and they deserved the gratitude of their million-and-a-half consumers for the work they had done in the past and were continuing to do. This was a great example of private enterprise, and he congratulated the Governor and Directors on their progressive policy, and wished them every success in the future. In connection with electrical competition, Major Salmon thought that gas and electricity were complementary to each other. In formally declaring the showrooms open, he trusted that the Gas Light and Coke Company would reap the success they so richly deserved, and that this new enterprise would be amply justified.

Sir DAVID MILNE-WATSON briefly thanked Major Isidore Salmon for opening the premises, and cordially invited the visitors to inspect them.

DESCRIPTION OF THE PREMISES.

The new premises, situated in the High Road, Wembley, are almost opposite Wembley station, and in a very prominent position. Owing to the regulations of the Local Council, it was not permissible to build more than one floor on the street level on that side of the road; but behind the road the ground falls away sharply to a lower level down to which the building extends, so that the ground floor on the street level becomes the second floor when viewed from the back. The exterior is attractively finished in Roman stone with bronze framing. The

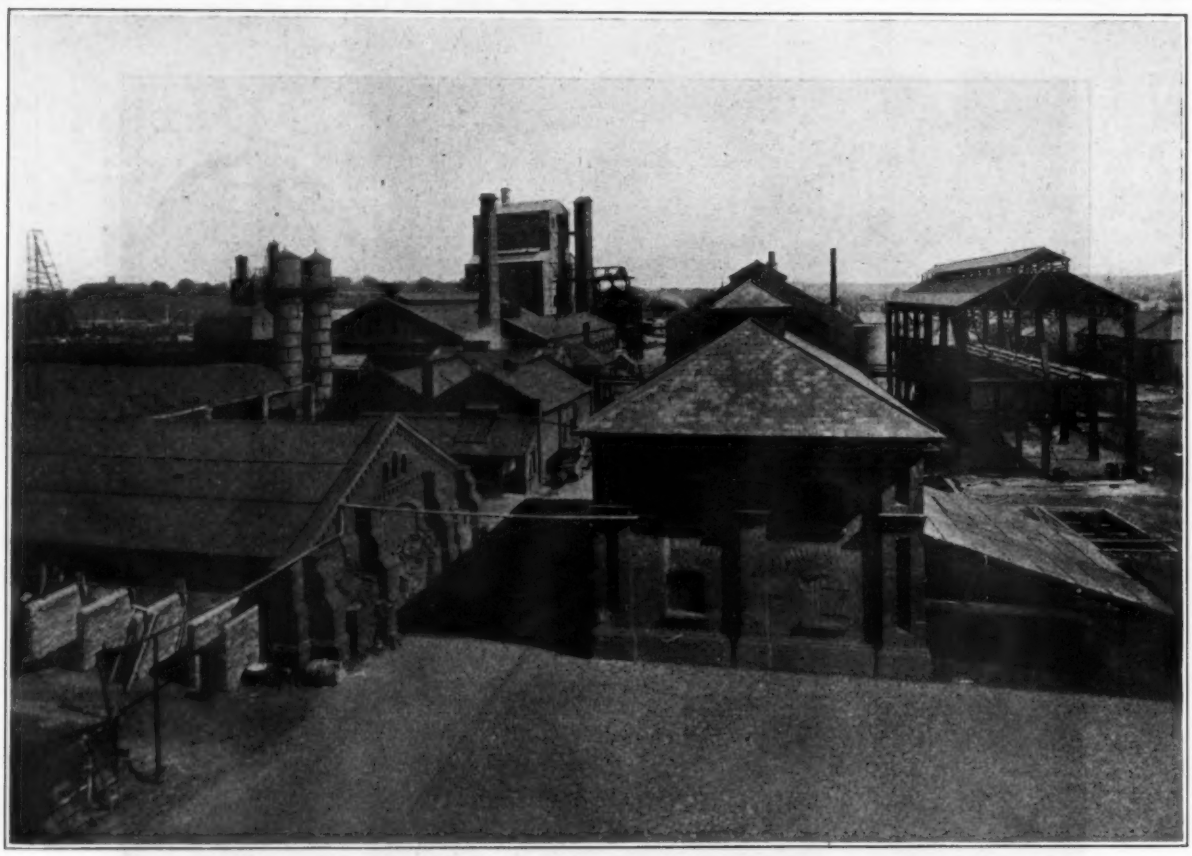
street door opens direct into the main showroom, in which are the inquiry desk, and artistically arranged high-grade fires and cookers. The interior of this section is beautifully decorated in blue lined with gold. Behind this is the second section, which is devoted to all kinds of gas apparatus, including hire fires and cookers, a composite range, gas and coke boilers, geysers, incinerators, irons, and an "Electrolux" refrigerator. Most of the appliances are fitted up for demonstration purposes. Overhead are all kinds of lighting fittings with attractive shades, all being switch controlled. In this section also is the cashier's counter with a large safe behind. On the next floor below is the main office and the inspector's rooms and those of other officers, while on the lowest floor, or ground floor from the back, are the staff dining room which can be used as a recreation or demonstration room, and the kitchen. Behind the showrooms and entirely separate therefrom are the stores, which are of large dimensions.

The architects responsible for the design, arrangement, decoration, and furnishing of the showrooms, offices, and stores are Mr. Walter J. Tapper, A.R.A., President R.I.B.A., and Mr. H. Austen Hall, F.R.I.B.A. The contractors employed for the showrooms were Messrs. Chinchen & Co., of Wellington Road, N.W. 10, and for the stores Messrs. Kirk & Kirk, Ltd., of Newington Butts, S.E. 11.

INAUGURATION OF "W-D" CONTINUOUS VERTICALS AT HEREFORD.

During the past ten years, the annual output of gas at Hereford has increased by over 30 p.ct., and in 1927 the Gas Committee were faced with the problem of either reconstructing and extending their existing plant, or, alternatively, of installing some new type of plant. After a close study of modern systems of carbonization, it was decided to replace the horizontal retorts by an installation of Woodall-Duckham continuous vertical retorts. The anticipated saving to the city as the result of the substitution of this type of plant was several thousand pounds per annum; and though the plant has only been in operation for a period of less than two months, working results clearly indicate that this saving will be effected.

Hereford was originally supplied with gas by a private Company, which was acquired by the City Council in 1872; a sum of £861 being paid for each £100 share capital. The present works in Mortimer Road were opened in October, 1880, to replace the old works which were established in 1824, and closed down after being in use some 56 years. In the year ended Dec. 31, 1873, the gas made amounted to 48,086,000 c.ft.; while for the year ended Dec. 31 last, the corresponding figure was 230,136,000 c.ft. The total length of mains in the district is 49 miles. The undertaking serves 2003 ordinary consumers and 3971 slot consumers—a total of 5974.



GENERAL VIEW OF THE GAS-WORKS, TAKEN FROM NO. 3 GASHOLDER.

Gas Manufacturing Plant.

The carbonizing plant at the present works, which has been superseded by the new installation of continuous vertical retorts, consisted of eight benches of horizontal retorts, each bench containing eight retorts, 19 ft. 6 in. long, 22 in. by 16 in. ⊏ shape, operated by de Brouwer machinery, the coke being handled by an electric trolley hoist and runway, erected in 1916. In addition, a carburetted water gas plant of a nominal capacity of 525,000 c.ft. per day was installed in 1922 by Humphreys & Glasgow, Ltd.

The new installation of continuous vertical retorts is capable of producing 1,200,000 c.ft. per day, and is complete with waste-heat boiler, rotary wagon tippler, gravity lip bucket conveyor (for the handling of coal and coke), and coke screening and storage plant. The contractors for the scheme were the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd. The reconstruction scheme also includes a new ammonia washer, new sidings and weighbridge, and the re-organization of the administrative offices and stores.

From the vertical retort house the gas is conveyed through a length of 21-in. main to the condensers, which are water cooled, having been converted from the atmospheric annular type. The wet purification plant comprises a Walker purifying machine, two tower scrubbers, and a static washer erected in 1928 by the Chemical Engineering Company, Ltd.

The oxide purification plant consists of four boxes, each 25 ft. square by 5 ft. deep, supplemented by two catch boxes. From the oxide purifiers the gas passes through the station meter to the holders, which have the following capacities:

No. 1.	Erected in 1880	300,000 c.ft.
No. 2.	,, ,, 1883	300,000 ,,
No. 3.	,, ,, 1919	500,000 ,,

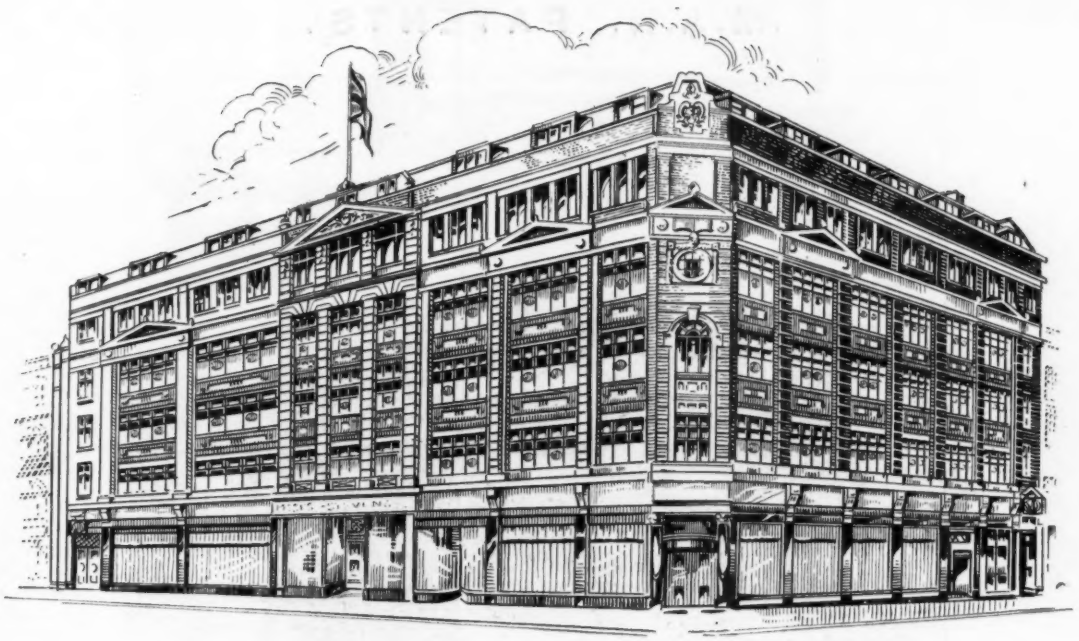
New "W-D" Verticals.

The installation consists of one bench containing twelve retorts heated by means of two producers placed at ground-floor level at one end of the bench.

Coal is brought in railway wagons to the end of the retort house, at which point the wagons are run on to an electrically driven rotary tippler which discharges the coal into a receiving hopper underneath. Thence the coal is fed by means of a jigging feeder into a single roll breaker. The broken coal is fed through a suitable delivery chute into a 25-ton per hour gravity lip bucket conveyor encircling the retort house and arranged with a loop to the screening plant. The conveyor elevates the coal and discharges it into overhead storage hoppers arranged above the retort house bench. From the storage hoppers the coal is fed through valves into auxiliary supply hoppers attached to the top mouthpieces of the retorts. Each retort is about 25 ft. high, and of rectangular tapered shape, so designed as to allow continuous regular movement of the charge through the retort.

The design of the setting is in accordance with the latest

THE WOODALL-DUCKHAM COMPANY



HEAD OFFICES

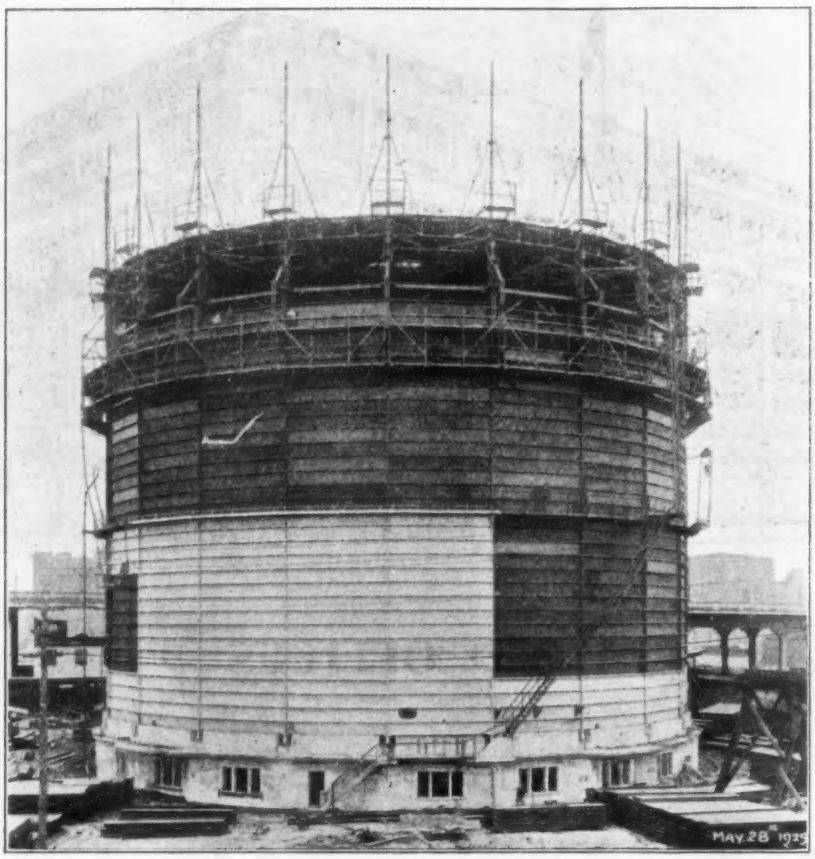
A CLEARING HOUSE FOR CARBONISATION PROBLEMS

The
WOODALL-DUCKHAM COMPANY
ALLINGTON HOUSE, 136 VICTORIA ST. LONDON, S.W.1.

The WOODALL-DUCKHAM VERTICAL RETORT & OVEN CONSTRUCTION CO (1920) LTD

WATERLESS GASHOLDERS.

(M.A.N. PATENTS).



3,000,000 c.ft. capacity WATERLESS GASHOLDER being erected by us at VANCOUVER, British Columbia.

We have also the following WATERLESS GASHOLDERS in process of construction :—

For Edinburgh Corporation - 5,000,000 c.ft. capacity.
For Clitheroe Corporation - 500,000 c.ft. capacity.

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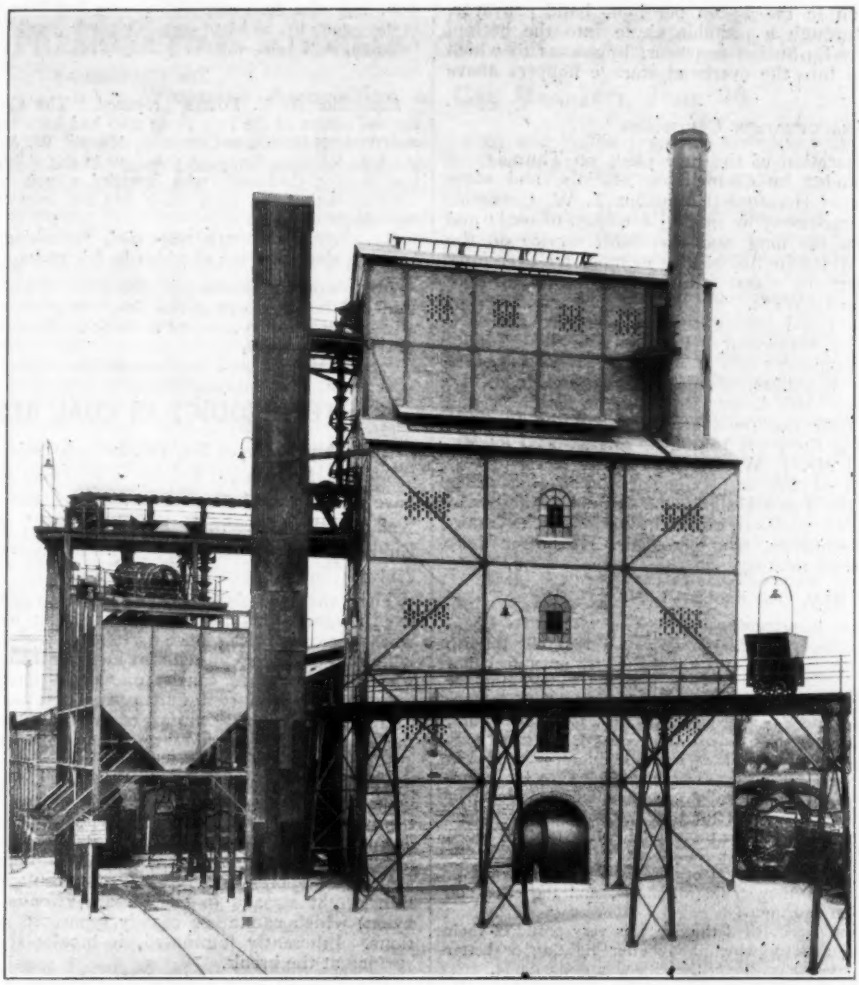


EXTERIOR VIEW OF NEW VERTICAL RETORT INSTALLATION.

practice of the Woodall-Duckham system, special features being as follows:

(1) Each retort is absolutely separate from the next; a straight joint being built between the retorts so that any individual retort can be heated up, cooled down, or scurfed without affecting the others. Each retort is provided with its own producer gas, secondary-air, and waste-gas dampers; thus forming a separate heating unit. By thus arranging that each retort is a separate unit, maximum flexibility in output is obtained.

(2) The retort faces and combustion chambers are constructed of the highest-quality silica material for the full depth of the combustion chambers. This ensures low maintenance costs, coupled with high output per retort.

(3) In order to provide means of varying the relation between the temperatures at the top and bottom of the combustion chambers, means are provided for the introduction of additional secondary air at a second point in the combustion chamber. It is thus possible to vary the zoning of the heats according to the type of coal carbonized and the calorific value of the gas to be made.

(4) Both the side walls and the top of the bench are heavily insulated, with the double object of improving the working conditions and saving fuel.

PRODUCERS.

For heating the retorts two producers, each large enough to supply the gas for heating six retorts, are built at the retort house floor level at one end of the bench. They are arranged so that one producer may be shut down without interfering in any way with the working of the other producer. The gas from either producer may be taken to the heating flues of any of the retorts. The producers are of the step-grate type and are constructed with ample grate area. This type of grate eliminates the need for clinkering. The only attention required to keep the producer fire in proper condition is a periodical pricking up at intervals of four hours, or longer, dependent on the class of fuel used.

WASTE-HEAT BOILER.

For utilizing the major portion of the heat content of the waste gases after they leave the retort bench and before they are discharged to atmosphere, a waste-heat boiler is installed. The boiler, which is of special design, is of the horizontal, multi-tubular, fire-tube type, suitable for a working pressure of 120 lbs. per sq. in. It is fitted with all the necessary steam and water mountings and fittings, including high and low water alarm and "Thermo-feed" regulator. In order to keep the inside of the tubes clean and free from dust, the boiler is fitted with steam jet blowers of the Parry type. To maintain the draught necessary for the satisfactory working of the settings, an induced draught fan is provided on the outlet of the boiler. This is driven by means of a 15 H.P. de Laval steam turbine, direct coupled with the fan shaft.

COKE HANDLING PLANT.

The coke contained in the hoppers below the retorts is discharged on to the gravity lip bucket conveyer, and is conveyed either into an overhead storage hopper forming an extension of the overhead coal storage hoppers which serves to supply the fuel for the producers or for filling the retorts at starting-up or after scurfing; or, alternatively, the surplus coke is delivered by the conveyor into a rotary screen arranged to separate the coke into four sizes—namely, breeze, small, medium, and large. These sizes are delivered direct into the proper compartments of a battery of storage hoppers arranged above the existing railway siding. The hoppers are fitted with suitable doors and chutes for feeding the various sizes into railway wagons or into carts.

When desired, the surplus coke may be discharged from the auxiliary hoppers underneath the retorts into a side tipping skip which runs on steel rails laid in the floor of the retort house. This skip can be run into the electrically-driven lift and elevated up to the level of an outside coke gantry, along which the skip is run and discharged into the yard as required.

COAL STORAGE.

In order to have a reserve supply of coal, the existing horizontal retort house is to be converted into a coal store. From the main overhead storage hoppers a chute conveys the broken coal on to a band conveyor having a capacity of 25 tons per hour, which distributes the coal into a store by means of suitable ploughs. When the coal from the store is required, it is reclaimed through specially-designed chutes arranged in the

floor of the store on to the 25-ton per hour band conveyor, which delivers it through a portable chute into the bottom strand of the gravity lip bucket conveyor, by means of which the coal is delivered into the overhead storage hoppers above the retort bench.

Inauguration Ceremony.

The formal inauguration of the new plant on Thursday of last week was attended by Councillors, officials, and some guests. The Mayor of Hereford (Councillor T. W. Goodwin, J.P.) performed the ceremony by tipping a wagon of coal; and congratulations upon his long and successful service on the Gas Committee (of which he has been a member for over forty years, and Chairman for about a quarter-of-a-century) were extended to Alderman C. Witts. Sir Arthur Duckham, G.B.E., K.C.B., was present; and among the visitors were also Mr. C. M. D. Belton, of Shrewsbury (President of the Midland Association of Gas Engineers and Managers), Mr. E. Parry, of Oldham, Mr. H. J. Woodfine, of Wellington, and Mr. E. D. Wootten, of Malvern. Mr. Arthur Roberts (the Engineer and General Manager) fully explained all the details of the new plant, and in showing the party round he was assisted by Mr. W. T. Newton, and Mr. J. W. Boyle.

At the conclusion of the inspection of the works, those present returned to the Town Hall, in the Council Chamber of which they sat down to luncheon, on the invitation of the Chairman of the Gas Committee, who presided. Thereafter there was some happy speech-making.

A Real Old English City.

Sir Arthur Duckham, in proposing the toast of "The City Council and Trade," remarked that Hereford was a real old English city, steeped in tradition. Those who knew the city must feel that it was well served. The Mayor had done his part in working for the country, and the other members of the Council had given their time to make the place the city of charm that it was. Agriculture, of course, played a large part in the trade of Hereford, but there were also various industries represented. They were, therefore, interested in the question of unemployment. Now, what was the cure for unemployment? Personally, he was against subsidies, and that sort of thing; but he felt there was something they could all do which would go far to put right the present unfortunate situation. If when making purchases they would be sure that what they bought were British articles, they would provide work for their fellow countrymen. This was an effort they could all make, and the effect on unemployment would be enormous.

The Mayor, responding, remarked that he was very proud of their Council. He knew of no city which had better lighting or better health than Hereford. For cleanliness the city was remarkable.

The toast was also acknowledged by Councillor Lieut.-Col. R. H. Symonds-Tayler.

Friendly Feeling.

Councillor E. F. Bulmer, who is Chairman of the Electricity Committee, happily submitted the toast of "The Gas Committee," pointing out that Alderman Witts (whose guests they were) joined the Committee forty-three years ago, in 1886. After nineteen years of apprenticeship, he was elevated to the office of Chairman, which position he had held ever since. The speaker alluded to the debt which the city owed to the late Lieut. C. V. Townsend, who laid down his life for his country, and to his successor at Hereford, Mr. W. W. Townsend, who subsequently went to Colchester. There was, he said, no one in the city who did not respect these two gentlemen. The present Engineer, Mr. Arthur Roberts, had proved himself a worthy follower after them. In 1906, when Alderman Witts first became Chairman, the production of gas was about 130 millions. They were now turning out 227 million c.ft. a year, so that during his Chairmanship the city had doubled its gas consumption, though the population had gone up only about 20 p.ct. He had been extraordinarily favourably impressed with the new plant, which was both labour saving and space saving.

Alderman Witts, in reply, declared that there was no rivalry between the Gas Department and the Electricity Department. There never had been, and the interests of the city were well served by both. Referring to the acquisition of the old Gas Company by the Local Authorities, he remarked that the shareholders received £861 for each £100 subscribed. The cheque for over £53,000 which was paid to the old Company must have been about the largest cheque ever handed over in Hereford. As to the price of gas, the Committee would not be satisfied until it had reached a lower figure; and although the plant had only been working six weeks, they had already reduced the charge by 9d. per 1000 c.ft. They anticipated from this plant a saving of some £8000 a year, and this 9d. reduction in price almost exactly represented that total. He wished to pay tribute to the way in which the Woodall-Duckham Company had carried out the contract. Every promise made by them when the Council adopted this scheme had been fulfilled to the letter. They were making 18,500 c.ft. per ton, in place of the 13,500 c.ft. of years ago. He also wished to acknowledge the helpfulness of the Engineers at both Shrewsbury and Wellington, whose works they inspected before putting in this new installation. Further, he must acknowledge their indebtedness to Mr. Arthur Roberts. No labour had been too much for him during the time the work was in hand, and he had carried out everything with conspicuous ability. [Applause.] The Corporation had sought no expert advice beyond that afforded to them by the Woodall-Duckham Company, and no man could have carried out his duties more satisfactorily than Mr. Roberts had done. Mr. Newton, who was put in charge of the work by the firm, had also done excellently. He had been a pupil at Hereford in days gone by, and had certainly made good. Then Mr. Boyle, the foreman, had been extremely helpful.

The Contractors.

Councillor A. E. Power proposed "The Contractors," mentioning the names of the four firms who had been engaged in the work—the Woodall-Duckham Company, Messrs. W. & T. Avery, the Great Western Railway Company (who put in the siding), and the Chemical Engineering Company, who installed a new washer. During the carrying-out of the work there had not been the slightest hitch in any shape or form.

Sir Arthur Duckham responded, remarking that the new carbonizing plant was one of which he felt proud.

An interesting feature of the proceedings was the presentation by the members of the Gas Committee to Alderman Witts of a gold cigarette case, as a mark of the esteem in which he is held as Chairman.

TERMINOLOGY IN COAL RESEARCH.

In Technical Paper No. 446, recently published by the Bureau of Mines, the authors, Reinhardt Thiessen and Wilfred Francis, have given particular attention to the terms "vitrain," "clarain," "durain," and "fusain," recently coined in England, and to the terms, "anthraxylon," and "attritus," evolved contemporaneously in America.

The conclusion is drawn that the English term "vitrain" has the same significance as the American term "anthraxylon." These terms apply to those portions of coals of bituminous rank which are made up of brilliant bands with conchoidal fractures. These bright bands consist of woody portions of trees which were turned into coal during the accumulation of vegetable matter in the woody swamps of the earlier coal-forming ages of the earth. The word "anthraxylon" is from the Greek anthrax (coal) and xylon (wood).

The English term "clarain" is considered to have the same general meaning as the American term "attritus." These terms are used to describe those portions of coal consisting of dull bands which had their origin in a miscellaneous assortment of vegetable débris such as small splinters of wood, cellular structures, spores and pollen grains, cuticles, and bark. The thin bright streaks in clarain are streaks of vitrain (anthraxylon) which cannot be readily separated from the duller portions. Inherently laminated, it breaks sharply with a small surface at the break.

The English term "durain" refers to a dull-band granular coal which is not common in American coals. It is difficult to break, and surfaces are always granular or matt. It is largely composed of opaque matter and spores in varying proportions.

The English term "fusain" is applied to what has been called "mineral charcoal" or "mother of coal" in America. This dark, fibrous, and powdery component is present universally in coal in small quantities.

The terms "anthraxylon," "attritus," and "fusain" may be used irrespective of the rank or geologic age of the coal. The terms "vitrain," "clarain," and "durain" should be used only for coals of bituminous rank.

The older terms of the Germans—namely, glanzkohle and mattkohle—have been used in various ways by different authors. Glanzkohle may have been used for what is now termed "vitrain," for clarain, or for both. Mattkohle is probably more nearly related to durain, though it may also have been used for the darker portions of clarain.

KAYE'S SEAMLESS STEEL OILFEEDERS.

Our illustration is of one of the seamless steel oilfeeders (valve type) fitted with a regulator screw under the thumb button, manufactured by Messrs. Joseph Kaye & Sons, Ltd.,

Lock Works, Leeds. By this device the user may adjust the thumb button in such a manner that the flow of oil is reduced to a minimum amount on depressing the thumb button.

Congress of the Royal Sanitary Institute.—Among the subjects to be discussed by the Royal Sanitary Institute at their Annual Congress in Sheffield from July 13 to 20, the problem of reducing the smoke pall over our cities will take a prominent place. One of the papers will be by Mr. W. M. Mason, Manager of the British Commercial Gas Association, on "Solving the Smoke Problem: The Gas Industry's Contribution."

PRESIDENTIAL ADDRESS OF MR. JAMES JAMIESON.

Waverley Association of Gas Managers, June 28.

I have to thank you for the honour you have conferred on me in electing me to the office of President of your Association, an honour I appreciate the more since it is the oldest established Society connected with our important industry, being founded in the year 1861.

Technical training was not so easily obtainable in those days, and progress depended principally on exchange of experience and knowledge; and I have no doubt many informative and interesting discussions took place at the early meetings of our members. One can visualize heated round-table discussions on subjects concerning the manufacture of gas, but more particularly retort house procedure, as carbonization took the primary place in gas-works administration. While it is equally important to-day, scientific control has brought about material changes, and purification, treatment of bye-products, distribution, and salesmanship offer scope for discussion which 68 years ago would have been considered unworthy of more than a passing thought.

DEVELOPMENT OF OUR INDUSTRY.

In order to focus the changes which have taken place in the carbonization of coal for the production of gas, I propose briefly to review the history of our industry. Like every other business, while progress has been slow it has nevertheless been thorough. Gas engineering, though having been practised for over a hundred years, is still in its infancy. It deals with the scientific treatment of coal, a subject much debated in the public Press to-day. In the conversion of a solid to a gaseous fuel it has attained a high efficiency, using only 20 p.ct. of the heat units in the process. This accomplishment is the result of years of research, the discarding of ideas and processes, and the careful study of the behaviour of the raw material. Tracing the evolution of carbonization stage by stage, one must be impressed with the enormous strides which have been made both in the design of plant and in the methods practised. By birth, gas manufacture was a low-temperature process for the reason that suitable receptacles or retorts could only be constructed in iron, a metal unsuitable for high-temperature application. Fireclay retorts were procurable as early as 1820, but their adoption was slow, and as late as 1843, though exclusively used in Edinburgh, had not found favour in London. While engineers in Scotland took the initiative in the manufacture and practical application of clay retorts, there seemed to be no general agreement as to shape; and round, square, oval, and D shaped all had their advocates, though the latter had been standardized in the South. Again, we had the question of setting the number of retorts per oven, the method of heating, and the use of both cast iron and fireclay in one design.

It is an interesting study, but I do not propose to do more than put again on record the remarkable innovation of the late Mr. Scott, of Musselburgh, a member of our Association, about the year 1882. Instead of the ordinary horizontal oven, he erected a vertical conical retort, the bottom end being sealed in water through which the coke was withdrawn. How this plant behaved in actual practice I do not know, but I suggest that it laid the foundation for the present method of vertical setting used to-day in both high and low-temperature carbonization processes.

Until about the beginning of this century gas was used principally for lighting purposes with flat-flame and argand burners; and while the clamour of the retort house was for higher temperature and efficiency, progress in this direction was restricted on account of the high quality of gas then the fashion. With the continued improvement in burner design and the ultimate application of the bunsen burner and incandescent mantle, an opportunity occurred for reducing the quality and increasing the production of gas per ton of coal treated. Engineers were not slow in taking advantage of this discovery, and, while the restrictions under which they had laboured had not been removed, they were at least lessened, and ingenuity was offered a chance. That full advantage was taken of this development is evident to-day, highly efficient plant being available to produce gas from 300 to 600 B.Th.U. per cubic foot, and each engineer having a range of selection suitable for his particular requirements. That this extended freedom marked the turning point in the history of our industry no one will dispute, and we have continued to progress despite the many obstacles and prejudices thrown in our path.

It would appear, therefore, that we were compelled to forsake low-temperature carbonization in order to provide a labour-saving smokeless fuel at a price attractive to the general public. That our effort has been appreciated is evident in the popularity of gas to-day; and in place of being suppliers of a fuel to meet an emergency, we are now merchants of a commodity which takes premier place in all domestic and industrial operations requiring heat. If support for this statement were necessary, one might quote the figures of the Edinburgh Gas Undertaking. In 1900 the total output of gas was 1,882,685,000 c.ft., and in the year just ended it was 3,221,868,000—an increase of 71·13 p.ct.

COAL.

In Edinburgh last year the cost of coal amounted to £196,000. One penny per ton rise or fall is the equivalent of £850. The importance of proper selection and wise purchase of our raw materials cannot be over-emphasized, as upon it depends to a large extent the success or failure of any undertaking. It does not follow that cheap coal is poor coal, or *vice versa;* and to arrive at a conclusion as to true valuation, a considerable amount of information is necessary. In small works where one coal can be standardized, or put under test at any time, much valuable data can be collected. In larger works, however, where coal supplies are pulled from many sources and mixed in use, the provision of special arrangements becomes necessary. Prior to the introduction of vertical retorts we tested coal in a small horizontal plant, the charge used weighing 80 lbs. While this plant gave a comparative result of different coals on the experimental basis, it was little guide as to the value of the coal when used on the works in inclined retorts.

With the introduction of the new vertical retorts it was arranged to put down a complete test plant. One oven of four retorts, complete with producer, was fitted so that the gas can go either to the common foul main or through the test plant. It has, however, been decided to use the oven constantly on test work either for the valuation of coals or for an examination of blends, and any alteration or adjustment in the working arrangements of the whole vertical installation is tried out first on this test oven. The capacity of the four retorts being 36 tons per day, it will be seen that results on a working scale are available. The whole lay-out is an exact replica of the works plant, and has been designed with the object of being able to test or experiment with any particular part of the process of manufacture. With this equipment we are not only in a position to provide the necessary data on which the value of a coal can be based, but are also able to watch its behaviour, study its

THE PRESIDENT

James Jamieson, of Edinburgh.

Mr. Jamieson received his gas-works training under his father at Thornliebank, succeeding him as Manager. Successively his grandfather, father, and Mr. James Jamieson managed this concern. He was transferred to the Dalmarnock Station of the Glasgow Corporation on their acquiring this undertaking. He has held appointments as Assistant Engineer and Manager to the Dunfermline Gas Commissioners, the Greenock Corporation Gas Department, and the Edinburgh Corporation Gas Department. He is a Past-President of the Scottish Junior Gas Association (Western District), a Member of Council of the North British Association of Gas Managers, and was the first Chairman of the Scottish Salesmen's Circle.

peculiarities and requirements, and investigate the methods or adjustments required to obtain its maximum efficiency value for any specific quality of gas desired.

Proximate Analysis of Coal.

Unlike most purchasers of coal, buying to a specification for our purpose is difficult. The proximate analysis may inform us of the percentage of the various constituents, but it does not convey to us any information as to the suitability of the coal for gas-works purposes. In any case the accuracy of a proximate analysis depends so much on the care exercised in taking the sample that its value is doubtful. Sampling is one of the most difficult duties of a chemist. If the result is to be of any value, the sample must be representative of the bulk. The difficulty is aggravated if the pieces of coal are varied in size, or if roofings, shaly ribs, or earthy material is present to any extent. To obtain a true sample, each material must be proportionately represented. If the sample is to be drawn from a wagon, a good part of the contents must be taken if reliable data are to be obtained. Whether the mixing and grinding is done by hand or mechanically, the greatest care must be exercised if loss in moisture is to be avoided. Sampling on our vertical test plant is done while the coal is being elevated, a 7-lb. bucket being drawn off at specified periods. The coal having been crushed and mixed, a more representative sample is possible, and more reliable results are expected.

Having obtained the proximate analysis, let us see how it helps in arriving at a conclusion. Table 1 shows the proximate analysis compared with the carbonizing results obtained in our horizontal experimental plant and with similar results from our vertical test plant. From a cursory glance it will be evident that the proximate analysis assists us little. The volatile matter gives no indication of how it will distribute, or of the results it will give on breaking up. To evaluate a coal for gas manufacture, it is necessary to go further; and if laboratory results are sufficient, then the "Gray King Assay on Coal" gives fairly reliable figures. I suggest, however, that something more than laboratory results is necessary when so much is involved. Table 1 shows some results obtained in our horizontal and vertical test plants; and from these certain interesting comparisons can be made.

Test Plant Results Compared.

It will be noted that Coal D shows the difference between the horizontal and the vertical results as 6·12 therms, whereas Coal H shows an increase of 11·52 therms. The various other tests exhibit similar discrepancies, and demonstrate that true evaluation can only be arrived at when results are available from the plant in which the coal is to be used. One often hears "thermal production per ton" used in comparing the efficiency of works and plant, but such comparisons prove nothing. So many factors enter into the matter—such as price of coal, cost of carbonization, volatile products, quality of gas and coke, and its suitability to meet the market requirements of the particular area—that, without knowledge, arriving at any conclusions is both misleading and inaccurate. To illustrate my point, take Coal A, which gives 91·01 therms of 515 B.Th.U. quality, the works or plant in which it is used would be assessed very highly on a thermal basis. However, one must go further; it is an expensive coal, and our volatile products are not at the present time the most valuable. If we look at the proximate analysis of the coal, the moisture and ash are low and the volatile content is higher in comparison than any of the other coals, but not proportionately greater to explain the difference in volatile products resulting from carbonization. The coal, however, would appear to be very suitable material for gas-making purposes.

When we come to the analysis of the coke, which represents a considerable portion of the value of the products of carbonization, we find the moisture content is 20·91 p.ct., which makes its usefulness as a fuel doubtful. It is true that in the test under review steaming to the extent of 16·6 p.ct. *plus* water quenching was practised; but with a figure as low as 5 p.ct. steaming, little improvement results. The coke is of fair appearance, but its capacity for taking up moisture is much in excess of any fuel we have to deal with. As the question of improving the quality of coke has been receiving much attention recently, moisture being an important factor, this particular coal would not meet any reasonable specification for moisture unless blended with other coals in such proportion as was found necessary. This limits the quantity which can be used and adds to the cost of carbonization. I have mentioned only this coal, though many more could be quoted to demonstrate the futility of comparing results of undertakings and plant without full knowledge of the circumstances. This coal, having characteristics peculiar to itself, and being unlike most Scotch coals now offered for gas-making purposes, I do not propose to take it into any further comparisons I may make.

It is generally accepted that for the production of 500 B.Th.U. gas in verticals our selection of coals in Scotland is limited; and with this I am in agreement, though it is not altogether necessary to purchase expensive coals to obtain this result. The plimsol line is considered to be about 450 B.Th.U., and an analysis of our various undertakings numerically supports this view. It may be a coincidence, but it is significant that the three largest undertakings, each producing gas with verticals, have a declared value above this figure; their combined annual output on a volumetric basis being 53·18 p.ct. of the total gas sold in Scotland. It might also be mentioned that these works are subject to the Gas Regulation Act with two or more tests per day, and will shortly have to comply with a continuous 24-hour record of quality on a recording calorimeter. In fact, in Edinburgh this arrangement is under test at the present time preparatory to being put into official use; so the question of selection of coal is an important one. It is, however, not so difficult a proposition as one might expect, and 500 B.Th.U. quality has been maintained without undue difficulty in Edinburgh with verticals for over two years; and the same may be applied to the other undertaking mentioned.

It has been suggested that a reduction of quality would lower the cost, but this does not follow; and coal again is a determining factor. In some cases a reduction in quality may mean cheaper therms, but in others the opposite is the case. Though many tests have been made, we have not found any advantage in departing from our present declared value, taking all circumstances into account. Again, one can accept the price per therm charged by the three large undertakings with some confidence in view of the stringent examination to which their supplies are subjected; and the cost of gas into the holder does not compare unfavourably with many much-boosted supplies which have yet to accept limited voluntary examination.

I might go further to emphasize my point. Coal No. 10 compares favourably in price with the others and is cheaper than D and F, which cannot under any condition produce gas of 500 B.Th.U. quality. Without testing under actual conditions this would not have been discovered, and I would strongly suggest that where test plants are not available the coals might be carbonized in separate retorts and a sample drawn to ascertain if the coal is carrying its weight for the particular quality aimed at, or if it is depending on others for inclusion in the blend. I would submit that the reasons why a 500 B.Th.U. declaration can be maintained in the larger works is due to the great care taken in selection of the raw material.

Since our vertical test plant was put to work our idea of coals has entirely changed, and many of the grades we formerly purchased, which were considered average coals for our requirements, have been withdrawn. This withdrawal has not been confined to cheap coal, both high and low priced material being equally affected—in fact, our average price is now lower than during any post-war period.

These tests might be used to discuss the general question of vertical retort carbonization. The coals were not selected, and were representative of our purchases prior to the introduction of verticals. Each test was carried out over a period of 96 hours, and the figures shown are the average of the daily results.

Throughput Per Retort.

The retorts were designed to carbonize 8·5 tons of coal with 9 p.ct. moisture, or 7·88 tons of dry coal; but in practice this has been much exceeded, unless when being used for highly coking coals. The material used in Test 8 has a coking index of one, and 9·83 tons were carbonized with a moisture content of 10·21 p.ct.; whereas in Test No. 2, with a coking index of five, 8·66 tons were treated with a moisture content of 4·33 p.ct. It should be mentioned, however, that the object of these tests was to obtain a maximum efficiency with the quality of gas as near 500 B.Th.U. as possible. In Test No. 2 the volatile matter in the coke was exceptionally low, 0·59 p.ct., which indicates rather drastic treatment. It is safe to assume, if quality had not been a consideration, that the throughput in this case could have been increased. Carbonizing capacity is determined by various factors, and coal is not the least important now that gas is sold on a thermal basis. It does not follow that output is governed by low quality of gas—in fact, these tests show the opposite to be the case, with the exception of Test No. 9, in which it should be noted that Chirls with a low percentage of smalls was carbonized. Tests Nos. 10 and 2 show the highest thermal outputs, with qualities of 501 and 515 B.Th.U. respectively. When considering throughput it must be remembered that moisture content varies considerably; and in the tests under review it is important to note that the highest percentage of moisture was found in the Chirls, which gave the highest thermal output, and this seems to support the generally accepted theory that coal freed from smalls can be carbonized at an increased rate, giving a higher output, and that moisture content does not to any great extent alter the result.

Tests Nos. 5 and 11 support this, and it will be noted that with normal throughput and percentages of smalls of 35·9 and 35·7, the volatile content in the coke is 6·20 p.ct. and 4·49 p.ct. respectively, indicating imperfect carbonization. Doubles, trebles, and Chirls have been considered more efficient and suitable material for vertical retorts, but these tests do not appear to support this. Tests C and C_2 showing a comparison of screened crushed coal and trebles from the same pit, and Tests F and G a similar comparison with Chirls. In the former test little advantage is shown in throughput, quality, or quantity of gas—in fact, the closeness of the results is remarkable—whereas in the latter test the discrepancy is abnormal, though the throughput is practically identical.

It would appear that to a large extent throughput is con-

TABLE I.—*Comparative Statement of Results in Horizontal and Vertical Test Plant.*

Name of coal	A.	B.	C.	C2.	C3.	D.	E.	F.	G.	H.	C,D,E,F.	C,D,E,F.
Type of coal	Crushed.	Crushed.	Crushed.	Trebles.	Double Crushed.	Crushed.	Crushed.	Crushed.	Chirls.	Crushed.	Double Crushed.	Single Crushed.
Test No.	1	2	3	4	5	6	7	8	9	10	11	12
RESULTS HORIZONTAL TEST PLANT.												
Gas made per ton, c.ft.	11,985	11,524	11,038	11,352	11,060	11,281	10,683	10,578	11,134	11,627	11,536	11,343
Calorific value	702·3	631·7	541	559	550	584	581	582	578	566	576	574
Therms per ton	84·17	72·79	59·68	63·46	60·83	65·88	62·07	61·56	64·36	65·80	66·33	65·07
Gas analyses, p.ct.—												
CO_2	2·61	2·15	3·88	3·7	3·95	2·47	3·87	4·65	3·72	3·25	3·43	2·93
O_2	0·00	0·11	0·11	0·22	0·11	0·11	0·32	0·11	0·11	0·10	0·11	0·11
C_nH_m	9·29	5·60	4·31	5·15	4·59	5·15	5·22	5·42	5·00	4·30	4·32	4·53
CO	7·93	9·57	13·25	13·43	13·57	11·59	11·39	13·23	13·38	12·92	13·69	13·81
CH_4	32·86	29·59	23·14	25·82	24·23	28·67	26·41	23·81	26·64	25·63	25·40	26·41
H_2	44·33	49·06	47·13	45·35	46·74	44·68	47·77	48·32	46·67	48·04	46·61	47·70
N_2	2·98	3·92	8·18	6·33	6·81	7·33	5·02	4·46	4·48	5·76	6·44	4·51
VERTICAL TEST PLANT.												
Throughput per day, tons	7·94	8·66	9·11	9·35	9·12	9·36	9·25	9·83	9·92	9·19	9·73	9·17
Gas made per ton, c.ft.	17,662	16,042	15,132	15,167	13,712	14,968	14,527	14,688	16,150	15,434	14,274	14,605
Average calorific value	515	515	477	477	485	481	485	471	459	501	493	484
Therms per ton	91·01	82·62	72·18	72·35	66·51	72·00	70·46	69·18	74·13	77·32	70·37	70·69
Gas make per retort per day	140,296	138,922	137,850	141,815	125,057	140,099	134,372	144,392	160,265	141,843	138,892	133,929
Therms per retort	722·62	715·5	657·56	676·47	606·57	673·92	651·76	680·04	735·37	710·57	684·7	648·23
Average coke extraction, 2-hr. draw, buckets	11·5	15	12·4	13·65	12·3	15	13·25	11·5	12·1	14·4	13·1	12·7
Average temperature top, ° C.	1,431	1,413	1,420	1,410	1,410	..	1,360	1,390	1,410	1,390	1,410	1,420
Check tile, ° C.	1,200	1,119	1,135	1,175	1,085	1,140	1,070	1,135	1,160	1,065	1,095	1,110
Tar, galls. per ton	..	13·68	14·27	15·72	12·62	13·46	10·7	17·00	15·6	12·8	13·5	13·3
Percentage steaming	16·6+ water	15 + water	6·3+ water	5·4+ water	6·5+ water	7·7+ water	5·4+ water	6·6+ water	7·4+ water	7·96+ water	6·5+ water	6·7+ water
Gas analyses, p.ct.—												
CO_2	2·34	2·45	2·87	2·73	3·87	2·74	3·20	3·84	2·62	2·92	2·78	2·90
O_2	0·07	0·11	0·12	0·11	0·43	0·07	0·14	0·11	0·19	0·18	0·12	0·12
C_nH_m	3·02	2·52	2·22	2·08	2·23	2·27	2·53	2·16	1·95	2·40	2·00	2·00
CO	19·25	16·03	21·47	21·26	19·75	17·76	18·77	21·81	24·72	18·71	20·55	20·33
CH_4	19·99	21·47	16·43	16·12	19·14	16·97	18·91	16·85	15·22	19·62	18·43	18·09
H_2	50·70	52·81	49·82	51·71	47·75	52·94	50·11	48·79	47·01	49·40	50·18	50·18
N_2	4·63	4·61	7·07	5·99	6·83	7·25	6·34	6·44	8·29	6·77	5·94	6·38
Proximate analysis of coal—												
Moisture	4·50	4·33	8·24	7·88	8·18	5·64	9·27	10·21	12·11	9·27	9·21	8·41
Volatile matter	38·85	35·62	32·92	33·80	32·62	30·92	29·90	33·39	33·19	32·83	31·71	31·67
Fixed carbon	53·10	54·75	50·70	51·51	50·10	53·43	54·52	51·31	50·75	53·55	51·92	53·47
Ash	3·55	5·30	8·14	6·81	9·10	10·01	6·31	5·09	3·95	4·35	7·16	6·45
Proximate analysis of coke—												
Moisture	20·91	12·66	10·63	17·71	6·60	14·41	11·79	14·49	16·15	9·12	7·60	14·20
Volatile matter	0·24	0·59	2·87	1·79	6·20	1·60	3·18	2·09	2·67	2·85	4·49	2·38
Fixed carbon	72·90	80·40	71·52	69·39	72·09	70·68	76·08	74·24	71·60	80·76	77·18	72·29
Ash	5·95	6·35	14·98	11·11	15·11	13·31	8·95	9·18	9·58	7·27	10·73	11·13
Coking number	..	5	1	1	1	3	2	1	1	2½	1	2
P.ct. volatile matter, dry ash-free basis	42·2	39·4	39·3	39·6	39·5	36·6	35·4	39·4	39·6	38·0	37·9	37·2
Therms per 1 p.ct. volatile matter, dry ash-free basis	2·16	2·10	1·83	1·82	1·68	1·97	1·99	1·75	1·87	2·03	1·85	1·90
Coal grading—												
Over 2 in.	24·2	17·5	20·4	0·4	9·5	17·5	14·5	21·6	33·2	22·7	4·6	12·5
2 in. - 1 in.	57·8	53·5	46·2	79·7	43·7	52·8	53·6	48·7	48·4	46·4	50·0	50·1
1 in. - ⅛ in.	6·9	6·1	7·6	5·2	10·9	9·7	8·2	6·9	5·8	7·8	9·7	7·5
Under ⅛ in.	11·1	22·9	25·8	14·7	35·9	20·0	23·7	22·8	12·6	23·1	35·7	29·9

trolled by the amount of smalls in the coal, and by the percentage of moisture and the volatile content of the coke; but high thermal output does not follow low quality of gas. These tests also show that, while our retorts were designed for a maximum production of 8·5 tons of coal per day, 9 tons can be treated with comparative ease when producing 500 B.Th.U. gas—a high tribute to the efficiency of the design.

CALORIFIC VALUE.

It will be seen that some of the coals, while giving a fairly high calorific value in the horizontal plant, in the vertical tests were unsuitable for our purpose without blending with other coals. It is significant from the results that satisfactory calorific value seems to follow the caking index and the percentage of smalls in the coal; and it was decided to investigate along these lines. Coal C, D, E, and F, being screened coal, were selected for the purpose; and it will be noted that individually they give calorific values of 477, 481, 485, and 471 B.Th.U. respectively, giving an arithmetical average of 478·5 B.Th.U.

With a mixture of the four coals, single and double crushed, very interesting results were obtained—Tests Nos. 12 and 11. It will be seen that the former gives a calorific value of 484 B.Th.U., whereas in the latter a figure of 493 resulted; but the throughput was increased from 9·17 tons to 9·73 tons, which might explain the difference. To check this, one of the coals was double crushed, and Tests Nos. 3 and 5 show an improvement at 8 B.Th.U., though the throughput was practically the same. If we take Test No. 9—the coal which gave the lowest individual figure in the series—we find 33 p.ct. of coal over 2 in. in size, and only 12·6 p.ct. of smalls, and a calorific value of 459 B.Th.U.; whereas in Test No. 8, which is on the same coal, we have 21·6 p.ct. over 2 in., and 22·8 p.ct. of smalls, giving a calorific value of 471 B.Th.U.

With coals B and H, no difficulty was experienced in producing 500 B.Th.U. gas, these being coking coals with indexes of 2½ and 5 and containing a fair percentage of smalls—23·1 and 22·9 p.ct. respectively. It will be seen from an analysis of the gas that the low calorific value is due to excessive formation of carbon monoxide. A caking coal reduces the percentage of this constituent by reducing the amount of surface available for the water gas reaction. It may also force the tar-laden gases towards the hot surface of the retort, thus fixing some of the tars as gaseous constituents, instead of the tar laden gases passing away through the charge as in the case of a non-swelling coal. This theory is supported if we refer to the tar yield in Tests Nos. 3 and 5; 14·27 galls. of tar being obtained with the lower calorific value and 12·62 with the higher quality. Double crushing of the coal, and increasing the percentage of smalls, is probably a mechanical means of getting the same conditions in the retort with a non-caking coal as are present

when a swelling coal is being carbonized. The effects of caking, size, and double crushing are shown in Table 2.

TABLE 2.

Test.	Type.	Coking No.	Calorific Value.	P.Ct. CO in Gas.	P.Ct. Coal Through ¼ In.	Throughput, Tons per Day.
9	Chirls	1	459	24·72	12·6	9·92
8	Crushed	1	471	21·81	22·8	9·83
4	Trebles	1	477	21·26	14·7	9·35
3	Crushed	1	477	21·47	25·8	9·11
6	,,	3	481	17·66	20·0	9·36
12	,,	2	484	20·33	29·9	9·17
7	,,	2	485	18·77	23·7	9·25
5	Double crushed	1	485	19·75	35·9	9·12
11	,,	1	493	20·55	35·7	9·73
10	Crushed	2½	501	18·71	23·1	9·19
2	,,	5	515	16·03	22·9	8·66

It may be suggested that, by reducing the percentage of steaming, the formation of CO might be limited; but with retorts of 8·5 tons capacity about 5 p.ct. steaming is necessary to maintain satisfactory working conditions at the bottom of the retort. The calorific value, therefore, seems to be determined to some extent by the amount of smalls in the retort in the case of non-caking coals, and with caking coals appears to follow the coking index, though it is difficult to explain Test No. 6, where a low quality is shown with a coking index of 3, unless the smaller percentage of smalls is the cause.

YIELD OF TAR.

It will be readily observed that the tar yield varied considerably during the tests. This is apparently influenced by three main factors; and reference has been made to this matter when discussing the quality of gas.

(1) Coking coal gives less tar than non-coking coal.
(2) When the coking number is the same, the tar yield is greater the larger the size of coal.
(3) High throughput tends to increase the tar yield, as would be expected.

TABLE 3.—*Relationship between Tar Yield, Coking Number, Size of Coal, and Throughput per Retort.*

Test No.	Type of Coal.	Coking No.	Tar. Galls. per Ton.	Coal. P.Ct. over ¼ In. Size.	Through-put per Day.
8	Crushed	1	17	77·2	9·83
4	Trebles	1	15·72	85·3	9·35
9	Chirls	1	15·60	87·4	9·92
3	Crushed	1	14·27	74·2	9·11
11	Double crushed	1	13·5	64·3	9·73
5	,,	1	12·62	64·1	9·13
7	Crushed	2	10·7	76·3	9·25
12	,,	2	13·3	70·1	9·17
10	,,	2½	12·8	76·9	9·19
6	,,	3	13·46	80·0	9·36
2	,,	5	13·68	77·1	8·66

Table 3 shows the relationship between tar yield, coking number, size of coal, and throughput; and it will be seen that the tar produced follows closely the coking index of the coals, and that caking coal forms less tar than non-caking. It follows, therefore, that double-crushed non-caking coal should give a smaller tar yield than single-crushed, with consequent cracking of the tar. Tests Nos. 3 and 5 show the tar results from the same coal, double and single crushed; the production being 14·27 galls. and 12·62 galls. respectively. The explanation for this is probably that with a non-caking charge of large coals such as the Chirls used in Test No. 9, the gas laden with tar passes away through the centre of the charge, bearing with it the uncracked primary tars. When the coal is of a caking nature, or when the charge is dense on account of increased smalls, as shown in Tests Nos. 11 and 5, the gases laden with tar are forced to the retort walls, giving it an opportunity of cracking.

COKE.

Too long have we considered this a bye-product, and our indifference as to its quality has endangered its reputation. Much research work has been done to supply the public with a gaseous fuel of constant quality and purity. Coke, however, until recent years did not receive the attention it deserved, though it contains the greater portion of the heat units in the coal. Competition has done much for the gas industry, and we appear only to take action when our markets are threatened. If this was so in the case of gas, it is equally true with coke. In Edinburgh we have 70,000 tons available for sale, and of this a fairly large quantity is exported annually. This fuel appears to give every satisfaction, and of recent years has been much in demand. While this increased popularity abroad is encouraging—and it would appear to be the result of improved quality—it is difficult to explain why it is necessary to export if there is a demand for a solid smokeless fuel at home. It is used abroad principally for domestic heating in slow combustion stoves. While this type of stove is used in this country, it is not the popular method of heating; the open hearth being much in favour. The question therefore must be studied from this point of view. Can gas coke be burned efficiently for domestic heating requirements? Our ordinary quality is used in demonstration grates at our showrooms and in ordinary fireplaces at our offices; and with improvised arrangements we have displayed its usefulness at many of our exhibitions. A considerable amount of publicity has been given it both by poster and by newspaper advertisement; and while its use has been largely increased, it has not yet become the popular domestic fuel. Complaints are made; and with the object of investigating these, we have appointed an inspector to follow them up. From a result of his examination we have collected some useful information; one important point being that the same coke used in similar fireplaces does not always give the same satisfaction. We have also found no general agreement among consumers as to size or grade. Most complaints arise on account of difficulty in igniting.

It has been shown that a satisfactory free burning smokeless fuel can be produced without forsaking the firmly established practice of high-temperature carbonization. The experiments carried out at Ramsgate have demonstrated that by suitable blending of coals, and carbonizing in intermittent retorts where the charge is static, a fuel can be obtained with all the attributes claimed for low-temperature carbonization. This is a progressive development and one which will have far-reaching effects in our industry. Unfortunately all of us have not suitable plant to enable us to adopt this process; but I am convinced that by suitable selection and blending we can produce a smokeless fuel which will go a long way towards meeting the domestic consumers' requirements. Much was learned during the last two coal strikes, when importation of supplies from America had to be resorted to; and this fuel, with its low moisture and ash contents, when blended with our non-caking coals produced an ideal domestic fuel much in demand long after normal conditions had returned.

More recently, however, a further lesson has been learned through the ill-advised scheme of the colliery owners last year in increasing the price against public utility undertakings, when we took advantage of shipping supplies from Durham. While this material is not comparable with the American coal, its inclusion in our mixture has improved the quality of our coke. Sir Arthur Duckham, G.B.E., K.C.B., in his paper on "The Handling, Preparation, and Utilization of Gas Coke" at the Carbonizing Conference held in Birmingham in February of last year, stated the requirements of high-class coke as follows:

(*a*) Low ash.
(*b*) Suitable strength, density, and combustibility.
(*c*) Low moisture.
(*d*) Suitable size.
(*e*) Constant quality.

Of these, I propose to deal only with size, for with continuous vertical retorts this is an important matter. Scotch coals are principally of a non-caking nature and pass through the retort exactly as they enter, with a tendency for the coke to be slightly smaller. I have shown in Table 4 a comparison of the coking index in relation to size of coal and coke obtained from the tests submitted in Table 1. It will be seen that a very small proportion of the coke is larger than 2 in. in size, and that a considerable amount is under 1 in. and has to be sold as breeze.

TABLE 4.—*Comparison of Coking Index in Relation to Size of Coal and Coke.*

Test No.	Coking No.	Coal.				Coke.			
		Over 2 In.	2 In.–1 In.	1 In.–¼ In.	Under ¼ In.	Over 2 In.	2 In.–1 In.	1 In.–¼ In.	Under ¼ In.
2	5	17·5	53·5	6·1	22·9	26·5	55·7	6·1	11·7
3	1	20·4	46·2	7·6	25·8	9·2	53·2	10·3	27·3
4	1	0·4	79·7	5·2	14·7	5·7	63·7	12·3	18·3
5	1	9·5	43·7	10·9	35·9	8·2	43·5	10·0	38·3
6	3	17·5	52·8	9·7	20·0	19·9	53·3	8·0	18·8
7	2	14·5	53·6	8·2	23·7	19·5	48·0	8·2	24·3
8	1	21·6	48·7	6·9	22·8	7·4	49·4	13·3	29·9
9	1	33·2	48·4	5·8	12·6	8·6	60·6	10·3	20·5
10	2½	22·7	46·4	7·8	23·1	19·5	55·2	7·9	17·4
11	1	4·6	50·0	9·7	35·7	6·3	48·9	9·0	35·8
12	2	12·5	50·1	7·5	29·9	7·3	49·7	12·7	30·3

Test No. 9 shows 33·2 p.ct. of coal and 8·6 p.ct. of coke over 2 in.; the higher percentage of the Chirls being graded above 1 in. It would appear, therefore, that only two grades of suitably prepared fuel could be obtained from these coals. Still there is a considerable demand for supplies of fuel over 2 in., and the breeze is important. With large coal carefully handled greatly improved results can be obtained; and with this object in view we have recently put to work a Norton coal breaker

which, unlike the roll crusher, pierces the lumps to any desired size, and thereby minimizes smalls. The result of a test carried out in this plant in comparison with a roll crusher is shown below:

—	Roll Crusher.	Norton Breaker.
	P.Ct.	P.Ct.
1 in. and under	26·0	12·26
1½ in.	23·3	3·23
2 in. and over	50·7	84·51

This shows a considerable improvement in the percentage of coal over 2 in., and, with suitable blending material in the nature of highly coking smalls, we are hopeful that we may be able to improve our supplies of coke and produce a satisfactory smokeless fuel for all domestic purposes.

Coal Handling at the Pit.

It has been suggested that if coal were thoroughly cleaned at the pit we should be able to pay a higher price; and so far as smalls are concerned this may be true. Screened coal, however, should be freed from all foreign matter apart from the inherent ash which no washing or picking will remove. Many coals produced in Scotland are difficult to handle in this respect, and these are invariably put forward as gas coals. Shaley ribs, roofings, earthy material, and stone are common attachments. In some cases the amount present is small, in others it predominates throughout the whole seam. Careful handling and proper picking at the pit are essential if the difficulty is to be overcome. In Scotland the reputation of gas coke has suffered more on account of this than for any other reason. When a coal is supplied to us for test, our procedure is to select one wagon and examine it. Two experienced men are employed, and each piece of coal is carefully examined, the inert material removed and weighed, and a percentage arrived at. If more than 0·5 p.ct. is found in the sample, the test is rejected. This hand picking is also applied at frequent intervals during the currency of our contracts. In this way we have been able to keep our supplies up to standard. While this drastic examination may fail at times, the records over a large number of tests give a good indication of the regularity of the seams.

The average results of a number of coals give the highest percentage of foreign material as 4·65 and the lowest as 0·04 p.ct.; the latter being much below the average. The cost of this examination amounts to 1s. 2d. per ton of coal handled; but when it is considered that 1 p.ct. of inert material in our total coal carbonized last year represents approximately £2000, apart from the damaging effect it has on the reputation of the coke, the expense is justified.

Complete Gasification.

I have discussed the question of the preparation of coke, and have urged the importance of satisfactory quality, for under present methods of production of gas we have no option but to market it in competition with other solid fuel. Very few undertakings are supplying gas from total gasification processes. One might use Tranent and Prestonpans as examples where the one-stage process is being successfully applied. I am not concerning myself meantime with the merits of high and low grade gas, this subject having been discussed on many former occasions, and we are agreed that quality is a question of economics and expediency. What does concern me is future policy. It is evident that, while gaseous fuel will grow in popularity, there will always remain a demand for solid fuel. If smoke abatement is to be successful, this fuel must be a product of carbonization. Two established carbonizing industries are in operation to-day, gas-works and coke ovens; a third being in course of exploitation, the Bussey low-temperature carbonization plant at Glenboig, which is estimated to supply 400 tons of smokeless fuel per day—about double the coke produced in Edinburgh. If the fuel can be supplied at a price to compare with, and if it takes the place of, raw coal for domestic purposes, the coke market will remain unaltered. Gas we treat as our principal product, whereas the other industries concentrate on the production of solid fuel. The establishment of the coke oven industry did not affect our coke market; this product being designed to supply the steel industry with a hard dense coke. In view of the depressed condition of this basic industry, the demand for fuel has been lessened, and an outlet elsewhere has been found. With suitable blending of coals and modifications in the ovens, a fuel is now being produced and marketed in competition with gas coke. This competition will increase as time goes on; and if low-temperature carbonization becomes popular the market price may be seriously affected.

If one were certain that the conversion of the domestic consumer to solid smokeless fuel can be accomplished at the same rate as the production of the fuel is increased, the question would not be so serious; but of this I am in doubt. Custom changes slowly, and I feel certain that this change to smokeless fuel will be no exception. Price will be a determining factor, and as producers of gas it will be a question of economics with us. I am not taking a pessimistic view of the position, as I feel that good quality gas coke will compare favourably with any of the other fuels; but I do feel that we must be prepared. We cannot afford to sell our coke, which contains 60 to 75 p.ct. of the original heat in the coal, at a price which will affect financially the gas-consuming public if by complete gasification this can be avoided. The question arises, What plants and processes have we available should this contingency arise? Any process must be able to produce gas to meet a demand of qualities in individual works ranging from 300 to 550 B.Th.U. For the lower quality the question has solved itself, but for the higher ranges the problem is a somewhat difficult one. Water gas plants have been a means of regulating the coke market with fairly successful results, but carburetting to any extent has not been necessary in recent years. With oil at the present price, and if we assume 2½ galls. per 1000 c.ft. to raise water gas from 300 to 500 B.Th.U., the price for oil alone is the equivalent to the total cost of coal gas of the same value.

What other process then can be considered? If cheap oxygen were available, it would help to solve the problem, and T. Campbell Finlayson, M.Sc., in his paper on "Industrial Oxygen," points out that, if gasification were carried to completion using oxygen, it would appear that about 95 p.ct. of the calorific value of the coal could be recovered, and about 90 p.ct. after allowing for steam—86 p.ct. of this being in the gas. A volume of 69,100 c.ft. of gas of 352 B.Th.U. per c.ft. would be available, inferior non-coking fuels would be adapted to gasification, while the higher qualities could be reserved for carbonization, and the gases would contain but little inert constituents. It would appear, therefore, that any development in the process to cheapen the production of oxygen is worthy of the whole-hearted support of our industry.

Again, there is the question of enrichment of water gas by the catalytic synthesis of methane from carbon monoxide and hydrogen, which has remained unchanged since the International Conference on Bituminous Coal in 1926. On that occasion Franz Fischer pointed out that twenty-four years ago it had been shown that carbon monoxide could be quantitatively reduced to methane by the use of hydrogen at atmospheric pressure, employing finely divided nickel as a catalyst; yet a practical exploitation of the process on a large scale had not taken place. The reason for this lack of development was, he submitted, that the methane produced would not be so much more valuable than the water gas as to make the process pay.

Such a process was, however, proposed and carried out experimentally by the Cedford Gas Producing Company some time previous to 1923. Water gas was subjected to partial liquification to remove a portion of the CO; sulphur compounds being eliminated at the same time. The reduction was then carried out in the presence of finely divided nickel at a temperature of about 300° C. acording to the equation:

$$CO + 3H_2 = CH_4 + H_2O + 50{,}800 \text{ calories.}$$

After the reaction was once started, it became self supporting; the resultant gas having a calorific value of 475 B.Th.U. and a composition of 30 p.ct. CH_4 and 60 p.ct. H_2, with only traces of CO and CO_2. The original gas had a calorific value of 290 B.Th.U.

There is no evidence to show that this process has been submitted to further large-scale tests; and it seems probable that the saving in costs which it offered in comparison with oil carburetting was not sufficiently large to induce undertakings to take the risk of installing an unproved process.

A considerable amount of research on the use of nickel catalysts in this reaction has been carried out, and indicates that the most satisfactory temperature lies between 265° and 275° C. In an experiment carried out at this temperature, water gas containing 38 p.ct. of CO and 41 p.ct. of H_2 was passed at a rate of 45 litres per hour over 10 grammes of catalyst, and 16 litres of CH_4 together with 15 litres of CO_2 were formed. The reaction therefore proceeded according to the equation:

$$2CO + 2H_2 = CH_4 + CO_2.$$

It does not necessitate the addition of hydrogen to the water gas as in the Cedford process, which operated at a higher temperature.

It may be said that the process does not appear to have attracted gas engineers in the past, and there is no evidence that tests on a commercial scale have been carried out. A large amount of research has, however, been done, and has indicated that the process is technically possible. Apart from the deciding factor of cost, the essentials to success are thorough purification of the gas and accurate temperature control.

The use of nickel as a catalyst is becoming increasingly common as technical difficulties are surmounted; and this proprocess therefore appears worthy of further consideration. It would probably be more suitable for adoption by large works than by small ones, on account of the technical control required by a process of this kind. If these processes could be perfected and applied on a commerical basis, it would place the gas in-

dustry in a position unlikely to be challenged by any other source of heat and power.

I have to thank my Chief, Mr. H. H. Gracie, for permission to publish these results, and for the assistance he has given me in the preparation of this address.

Discussion.

Mr. H. H. GRACIE (Edinburgh) said that after the excellent address they had listened to they would readily agree that a wise choice had been made by the members when they elected Mr. Jamieson as President. At the time they made that appointment the members of the Waverley Association had registered a triple honour—an honour to Mr. Jamieson, an honour to themselves, and an honour to the City of Edinburgh. The address was a worthy one, and would rank high in the annals of the Waverley Association. The author deserved the highest praise for his work. When he suggested to him (the speaker) that he should make the coal tests in Edinburgh the main subject of his thesis, he was delighted to accede to the request, for he felt that the data which they had collated in Edinburgh would be valuable to the industry. They would have gathered from Mr. Jamieson's address that at Granton they were now recovering something in excess of 80 p.ct. of the thermal value of coal in the form of smokeless fuel and other products. The tests were being continued; and he believed he could promise that at a later date one of the staff in Edinburgh would be in a position to put the results before the members of the Waverley Association and the industry in general. The question of coke, continued Mr. Gracie, was a very important one for the gas industry at the present moment. He thought the industry ought to recognize the fact that they required a great deal more publicity in bringing to the notice of the public that the industry had a smokeless fuel which could do all that was claimed by the other forms of coke on the market.

Mr. VASS said that Mr. Jamieson was to be congratulated on dealing so thoroughly with a subject which had been troubling many of them for a long time—namely, how to ascertain the working results that were obtainable in vertical retorts. He (Mr. Vass) remembered trying a similar test arrangement at Airdrie, but instead of confining it to a section of the works, his idea was that of ascertaining the full working results of the coal over a period of eight or sixteen hours, and isolating all the products for that period. In these tests he was fairly successful, and they were of great assistance in determining the value of various coals.

Mr. J. W. MCLUSKY (Glasgow) said that Mr. Jamieson had the advantage originally of having training in small works, and in that he was to be envied. Such training allied to experience in a more extensive concern was undoubtedly of importance when it came to the handling of coal. It was a good thing that in the coal industry a younger school was growing up just as had happened in the gas industry. Coal was getting much more attention now than it previously had obtained. An effort was being made to meet the requirements of buyers. At the works of the Glasgow Gas Department at Dawsholm they were carrying out some interesting experiments, but it was too early yet to say much regarding them. The field of investigation which was being opened up was a valuable one; and as there were many Managers in the Waverley Association who could not carry out these tests, it was up to the large works like Edinburgh and Glasgow to continue the research for the benefit of the industry.

Mr. DAVID FULTON (Helensburgh) remarked that his own experience had led him to the belief that even-sized fuels were most suitable for vertical retorts, and that coals containing a high proportion of smalls were less suitable. Mr. Jamieson in his paper, however, contended that coals containing a proportion of smalls gave better results. In Scotland there appeared to be a belief that coking coals were the best produced in the country. They were the highest priced, but he had not found them the most suitable for carbonization in verticals. The results given by Mr. Jamieson cut across the generally-accepted view as to the suitability of coals for vertical retorts. Mr. Jamieson had remarked that the selection of coals in large works was easier than in small works. He (the speaker) did not agree with this. The President had observed that when the coal was of a caking nature, or when the charge was dense on account of increased smalls, the gases laden with tar were forced to the retort walls, giving the tar an opportunity of cracking. He (Mr. Fulton) was not of opinion that there was cracking due to this cause. Mere contact with hot surfaces such as retort walls would not cause any considerable amount of cracking. With all, however, that the President had to say on the quality of coke he was in complete agreement. Grading was absolutely necessary.

Mr. W. M. MASON (Manager of the British Commercial Gas Association) suggested that one or two points of salesmanship emerged from the address. Sixty-eight years ago, it was thought to be unworthy of the industry to consider questions of salesmanship. Even to-day some people hardly considered it to be quite worth while. This was a terrible mistake. Mr. Gracie had urged that a great deal more publicity ought to be undertaken with the idea of popularizing the sale of coke. In that connection he (the speaker) thought it would be interesting to note the amount of money that the low-temperature carbonization people had spent in an endeavour to popularize their comparatively small output of smokeless fuel. An astute move in coke publicity had been made by Mr. W. B. McLusky, of Halifax.

The PRESIDENT thereafter briefly replied to the points raised in the discussion, and on the call of Mr. MCLUSKY (Glasgow) was accorded a vote of thanks.

PURIFICATION ASSISTED WITHOUT COST.

All engineers have experienced the difficulties of inert oxide due to the low temperature of exposed vessels such as purifiers, or of the gas stream, as well as the extremely variable load. Not only has a steady increase of the load to be dealt with, but a sudden increase due to the varying changes in the weather conditions; this increase in one well-known works being from 40 million to 80 million c.ft. in 24 hours.

New gas producing plant, more especially purifying plant, means considerable outlay, and cannot be installed at short notice, so what is the gas engineer to do when he knows that owing to the heavy gas demands the following troubles are likely to arise?

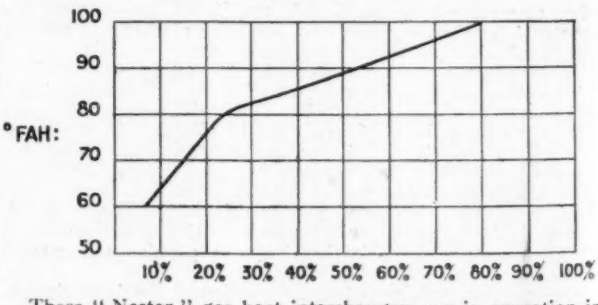
(1) The temperature of the gas in the condenser is too high, so that tar fog does not readily precipitate.
(2) The temperature in the washers also may be too high, with the result that ammonia, sulphuretted hydrogen, and carbonic acid may be carried over.
(3) If the temperature is lowered to make the previous two processes efficient, it is too low for efficient purification, and the oxide is inert.

The "Nestor" gas heater has been designed to overcome the above disadvantages. This apparatus is illustrated. It consists of heavy cast-iron casing with **U** tube heating surface of sufficient capacity to raise the temperature of the gas to the correct degree Fahrenheit to ensure efficient purification. Exhaust steam from the washer engine can be used as the heating medium for these heaters; the amount of steam required being 1 lb. per hour per 1000 c.ft. of gas.

The " Nestor " heater is inserted in the gas main between the final washer and the oxide purifiers; and its application enables the temperature to be dropped as required in the condenser and washers, and then to be raised to the required temperature before entering the oxide beds, thereby increasing the efficiency of all three processes. The heaters are fitted with gas inlet and outlet connections to suit any local mains. A range of heaters is manufactured varying in capacity from 40,000 to 300,000 c.ft. per hour, allowing a temperature rise from 60° Fahr. to 100° Fahr.

The ideal arrangement is to fit a valve on the inlet and outlet connection with a valved by-pass; but this is not essential, as it is possible to insert the heater in the place of an existing bend in the main with the gas passing over the heating surface continuously. The tubes offer practically no resistance, and the steam valve can be closed when no additional heat is required.

The increased efficiency of the oxide due to the gas entering the purifiers at the correct temperature is now well-known, and is clearly illustrated in the graph given below.



These " Nestor " gas heat interchangers are in operation in numerous stations throughout the country, and are manufactured by Messrs. Ashwell & Nesbit, Ltd., Engineers, 12, Great James Street, Bedford Row, W.C. 1, whose works are at Barkby Lane, Leicester.

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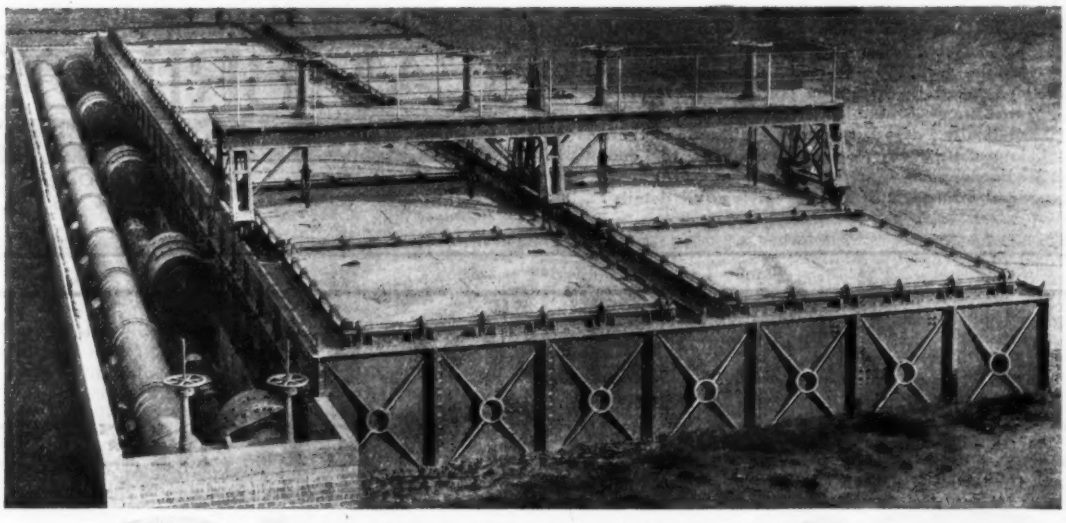

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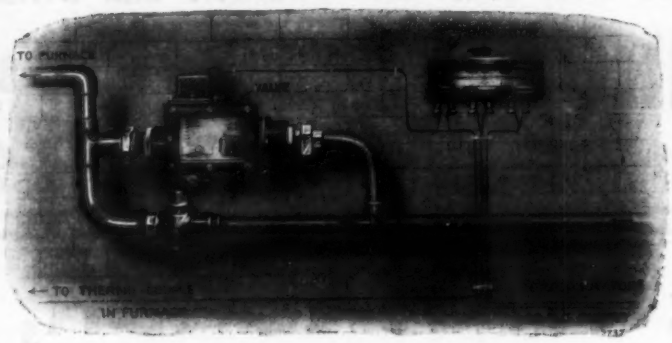

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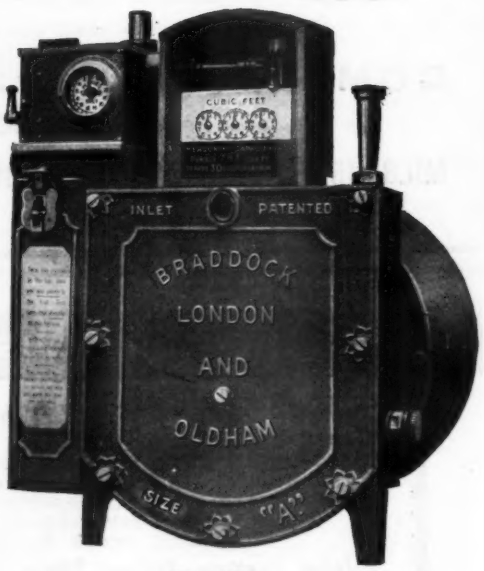

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GAS MANUFACTURE IN NEW ZEALAND.

From the Presidential Address of Mr. W. J. STONE (Engineer and Manager, Gas Department, City of Wanganui) before the Gas Institute of New Zealand.

Some two years back a discussion arose relative to the adoption of some national scheme of advertising. In conjunction with our Institute there have been meetings at different periods concerning this matter, with the hope of arriving at some finality that would be beneficial to the gas industry, but up to the present we are not fortunate enough to be able to report progress. It has always been recognized that a scheme would be difficult to initiate, but I am certain that if we were only fortunate enough to formulate some plan acceptable to all, our efforts would be well rewarded. The advantages of gas shoud be advertised nationally, instead of what is now the case—concentrating in the cities and towns. I am sure such united action is warranted, and some day must be undertaken to gain the patronage we deserve. I feel in duty bound to make passing comment upon, and extend our gratitude to, the ability and perseverance of the English manufacturers of gas plant. They are ever alert to the requirements of the gas industry; and their desire for greater efficiency is extremely keen. There is constant research work in progress, and the one great ambition is to attain improved methods. The results to-day have warranted the energy and zeal that have been devoted to gain the high standard of the gas industry, and we can look forward to the future with the greatest of assurance. No doubt by helping the manufacturer and seller of gas, the makers of plant also benefit themselves; but combined effort generally makes for community gain. It probably would be unfair to mention any particular section, but I do ask your indulgence to be privileged to mention the gas cooker manufacturers, as these firms, as far as my own experience is concerned, are most enterprising and eager to meet our requests or proposals, provided they do not clash with the efficiency of the gas cooker.

The efficiency of the gas cooker has improved beyond all expectations compared with even only a short time back, and with this progress appearance is marching hand in hand. The high standard is now well recognized by the public, and the demand for the gas cooker to-day is giving the manufacturers a part only of their just reward. In water heaters and gas fires, progress is just as outstanding.

WANGANUI GAS UNDERTAKING.

The Wanganui Borough Council offered to provide a site for a gas-works at a normal rent, and agreed to a Company having rights to manufacture gas for a term, afterwards fixed at twenty-one years, at the end of such period the town to have the right to acquire such business by giving twelve months' notice; the price to be paid to be the actual cost to the Company for all plant, *less* depreciation of 2 p.ct. per annum.

The first meeting of shareholders for the formation of the Company was held in March, 1877. The capital of the Company was originally £10,000, which was afterwards increased to £14,000, as it was found that the erection of the plant and laying of mains demanded an expenditure beyond that originally anticipated. The amount expended on plant by March 31, 1880, was £13,000. The plans and specifications of the works and plant were prepared by the Engineer for the Company, and tenders were invited; the accepted price for the plant being £4300 f.o.b. Glasgow. The tender for erecting the plant was £2843, and for the construction of the necessary buildings, £169 5s. The capacity of the gasholder was 33,000 c.ft. The town was first supplied with gas in May, 1879, the total number of consumers being 109; and the price charged was 12s. 6d. per 1000 c.ft.

The progress of the Company for the first three years of its existence was very slow, as the full capital was not subscribed, and calls remained unpaid on a large number of shares, with the result that the bank had to advance a large amount to enable the Company to finance its business. Thus interest formed a considerable amount of expenditure. Many shareholders forfeited their shares rather than meet the calls, due in some instances to inability to pay, and in others for want of confidence in the concern. However, the year ended March, 1880, disclosed a more prosperous return. The revenue from sales of gas to 279 consumers was £3359, and this enabled a dividend of 10 p.ct. to be paid. From that date till the termination of the Company this rate of dividend was maintained. It was not until about 1896 that any marked progress was made, but from that time the business developed rapidly; in fact, the revenue doubled in the remaining six years of the Company's existence. The prosperity of the business naturally induced the Council to exercise its rights to acquire the valuable undertaking for the ratepayers.

The term of agreement expired in 1899, but it was not till 1901 that the Council decided to give the necessary notice. A proposal was submitted to the ratepayers, and sanction was obtained to raise the necessary loan for acquiring the plant.

This brings us now to the period of 1902, when the gas-works were taken over from the promoters by the Borough Council. A new Manager was appointed, and he immediately arrived at the decision that practically the whole of the plant required scrapping and replacing by more up-to-date methods. This was accordingly approved by the Council, and preparations were at once put in hand for the securing of the necessary plant.

Either through lack of foresight, or it may have been through force of circumstances, the lay-out at this juncture sealed the line of future construction as regards extensions, though the works has really been reconstructed throughout within the last sixteen years. One serious action—namely, the building of the retort house and coal store parallel with one another, with one end abutting the street, and little room the other end, on account of purifying plant—made matters rather awkward, whereas had they even been built at right angles to one another, it would have alleviated the very considerable difficulty that had to be overcome.

The coal for the requirements of the works is delivered by means of an aerial ropeway, of R. & J. Dempster manufacture, direct from the hold of the ship to the store. Such plant has been in service for the past eighteen years, and has at all times proved entirely satisfactory. I have in view to recommend the replacement of the ropeway with a belt conveyor, which will be the means of facilitating the discharge of the coal from the ship with much greater speed.

About 1912, the maximum capacity of the then available carbonizing plant was reached, and the growing demand for gas meant an early settlement on some plan of extension. Unfortunately, owing to the retort house being blocked at either end from further extension, we were compelled to select a new site.

Just at this period the vertical retort came into prominence, and was discussed at great length in the columns of the "GAS JOURNAL," and my late father, who was then Manager, had to decide whether to adopt machine-charged horizontals or the vertical retort. He ultimately pinned his faith in, and decided on, the latter type, and I am pleased to say it has proved an extremely wise and happy choice. I certainly looked upon it as a bold choice at that time, for as far as New Zealand was concerned, from a practical standpoint, the vertical retort was an unknown factor. A tender was eventually accepted for the supply and erection, ready for working, of a single unit of vertical retorts, capacity 250,000 c.ft. per diem, on the Woodall-Duckham system. The erection was completed, and the plant was put into operation, in October, 1914. The value of the plant was recognized from its very inception, but with the continuation of the war any further extensions along this line were hopeless to expect. Consequently, we had to do the best possible, working the combined horizontals and verticals. These conditions prevailed until 1920, when two additional sets of vertical retorts were built, and commissioned as required. This allowed of the dispensing with the horizontal settings completely.

The outstanding features of the vertical retort were complete disappearance of pitch and tar troubles, and considerable reduction in the working staff. It was always more or less anticipated that with the coming of the vertical retort the choice of coal was likely to be limited. Matters are certainly limited in that respect, but not to the extent one would imagine. I have always maintained, and still stand by my opinion, that choice of coal, to get the best results, is most essential in horizontal retorts. The coal, as far as my experience is concerned, that gave the best results in horizontals applied also to verticals, and *vice versa*. Personally, I have always been an advocate for using the best coal available, with price as a consideration. When it comes to handling coal, there is just as much labour employed with the cheap as with the dear coal per ton. When returns and results come into the question, with the second-grade coal more plant is necessarily under commission, with its higher maintenance costs. More coal is handled for the same amount of gas, together with increased labour charges. Possibly a slump occurs in your coke sales through increased production, and your troubles are frequently carried to your reticulation. Not only does it lead to increased maintenance attendance, but also annoyance to your consumers; and the difference between a reliable and unreliable supply of gas is a matter of considerable importance to every manager. Again, the ash content of a coal is a consideration. Besides creating trouble in the producer, the refuse deposit of dust in the flues through the settings brings its burdens. There is also a greater heat necessary for satisfactory carbonization of the coal. All the above points are worthy of every manager's consideration.

The gravitation of the coal through the vertical retort has aroused a certain amount of suspicion from those who are not conversant with this class of retort, and especially so with

the caking coals of New Zealand. During the course of our experience we have had no cause for anxiety in this respect. It is true that we have used considerably greater proportions of Newcastle than New Zealand coal. I am prepared to say that New Zealand coal is not so comfortable, or nearly so acceptable, or as economical as a non-caking coal, but the conditions with verticals were not so bad as I have seen with horizontals.

Water Gas Plant.

We have installed a Humphreys & Glasgow carburetted water gas plant, with the back-run process. The plant, when carburetting, is considered capable of 400,000 c.ft. per diem, and blue gas 350,000 c.ft. Up to the present we have used it only as a blue gas plant. With the added water gas to the coal gas, a proportion of 25 p.ct., we have no difficulty in maintaining our declared value. As a matter of fact, the object of the carburetter was really for emergency purposes if difficulty arose by running short of suitable coal supplies.

Clinkering is not by any means a great undertaking, and usually follows after about eighty hours' working. It is done by means of a pneumatic pick, which we find meets its requirements most admirably. The pick dispenses with a good deal of heavy strain, and relieves the generator lining of considerable shock, which is most evident when carrying out this work with a bar and heavy sledge hammer.

The water gas is admitted at the most convenient and desirable point, and enters the foul main before the mixed gas passes through the condenser. In common with most managers, I believe in early admission in an endeavour to get the best combination possible. It is delivered at a regular hourly flow, and is measured by a volume recorder that is under constant supervision.

Special features attached to the plant worthy of comment are the leakage vents, whereby any leakage of gas or air past either gate of any blast or back-run valve is harmlessly discharged, and the location of the leak indicated to the gas-maker. The interlocking valve system is also a most favourable factor, and includes all valves. This creates safe and efficient working of the plant.

Exhausters.

The exhausters are of Bryan-Donkin production, and of the four-blade principle. The lubrication as applied to the pin and blocks of the different makes of exhausters has always appeared to me a contentious matter, and I regard it under present conditions as a method which calls for considerable improvement. A few years back I conceived what I thought to be, and still maintain is, an advancement on the present custom. The system common to you all for lubricating the pin of the exhauster is the axial lubricating passage, with which communicates a number of radial passages disposed along the length of the pin for conveying the oil to the bearing surfaces on which the block is mounted. The oil is fed in at one end of the pin with a force pump; and under this condition I have found that only the first half of the pin receives sufficient lubrication. The second half is running dry, and after a time this section becomes rough and scored through the grinding action of the dry pitch. What I propose is this: That the central lubricating passage of the pin, which is usually half-inch in diameter, and runs practically the full length of the pin, be divided for the whole of its length by a mid-feather driven in from the outside end. Of course the usual custom is followed, and each of the radial holes opens into a circumferential groove cut in the pin. For one-half section of the pin four radial holes are drilled, to communicate with the centre passage. The other half-section contains four similar holes, but on the opposite side and end of the pin. On the outside end of the pin is attached a **T** union, with two separate passages, which communicate one with each of the said passages in the pin, and also with oil feed pipes—one to each branch of the union from a double plunger force feed oil pump. Each plunger from the pump accordingly has a separate supply pipe to the exhauster. I am confident of the value of the above method. The oil will be distributed along the surface of the pin, thus ensuring sufficient lubrication, which must result in a distinct improvement in the working of the exhauster, both in reliability of running and in maintenance costs.

Meter Maintenance Shop.

Here we undertake practically the whole of the reconditioning of our meters. Many years ago the dry meter was chosen as the most suitable for our requirements. Consequently, we have concentrated solely on this type. We have not gone in extensively for the standard meter. I have still to be convinced of its claimed advantages over the "lights" type; and for lower maintenance costs and reliability, I pin my faith to the latter class. In comparison, take a No. 3 standard along with a 10-light meter. The former is claimed to give a highly increased hourly capacity. This is attained through increased speed, and not through internal capacity of materials; and this appears to me to be where the weakness lies.

Price of Gas.

I am a firm believer in a differential rate in the price of gas according to the consumption, and I certainly think the small consumer must carry his burden as well as the large one. For some years we have had a differential rate in operation here. This system we are carrying out to the best of our ability, and we think it is operating fairly both to the consumer and to ourselves, and I think we can claim that the price of gas to the Wanganui consumer is most reasonable. The rate is from 7s., gradually decreasing to 5s. 9d. Of course, the smallest consumer pays the highest price, and the largest consumer the least, per 1000 c.ft. It may lead some to think that the poorest citizen has to pay the highest price, but possibly not in all cases is the smallest consumer the poorest citizen.

MACLAURIN LOW-TEMPERATURE PLANT.

Report of Test by the Fuel Research Board.*

Last year—from May 13 to 19—the Fuel Research Board carried out a test on a unit of the Maclaurin plant erected at the Dalmarnock Gas-Works of the Glasgow Corporation. The construction of the plant has been described in the "Journal," but it may be mentioned that it consists of five units—more accurately described as "producers" than as "retorts"—of a rated capacity of 20 tons of coal a day each. The coal is carbonized by the heat produced by the combustion of a portion of the coke; air being admitted about the centre of the producer, and steam at the bottom. The effect of this is that the tars are given off, in the upper and cooler portion of the producer, at temperatures corresponding to those generally used in so-called low-temperature carbonization, but the coke then passes through a zone of higher temperature before discharge. Another effect, of course, is that the volume of gas produced is much greater, but its calorific value much lower, than with externally heated retorts. The main object of the plant is the production of smokeless fuel for domestic use.

The system cannot be described strictly as one of low-temperature carbonization—though the volatile products are removed at a relatively low temperature—since a part of the coke must pass the position in which combustion takes place and in which the temperature is not less than 1000° C. Tests carried out on the coke produced during the test showed, however, that the amount of coke which reaches this high temperature is small, and is not sufficient to affect the value of the product as a domestic fuel.

During the test 100 tons of a Scottish coal (supplied by the United Collieries, Ltd., from their Clydeside Colliery, Uddingston) were passed through the producer during a period of five days; but the producer would appear to be capable of carbonizing efficiently up to 24 tons of this particular type of coal in 24 hours. The only difficulties encountered during the test were due to the holding-up of the charge.

The weight, carbon, and thermal balances show that the test has been satisfactory; and definite yields of products can be stated for the carbonization of this coal. The yields obtained, calculated per ton of dry coal, were:

Coke	12·12 cwt.
Tar	17·8 galls.
Gas spirit (crude)	1·5 ,,
Gas	33,160 c.ft. = 77·26 therms
Liquor	48·1 galls.
Ammonium sulphate (including that in gas)	41·9 lbs.

The coke produced was well carbonized and contained 3·9 p.ct. of residual volatile matter. The largest size marketed, states the report, makes a good fuel for domestic purposes, and is little, if any, inferior to a low-temperature coke prepared, in externally heated retorts, at 600° C.

The tar is of a primary nature and resembles in chemical properties a tar made from a coal of similar properties carbonized by external heating at 500° C. to 550° C. The yield of ammonium sulphate is high, but the liquor produced is only of 6·2 oz. strength. The installation as erected is economical in labour.

It was evident from examinations of producers which were not in use during the test that the temperatures attained in the producers were not excessive, as little deterioration of the brick linings was observed. This is confirmed by the fact that no clinker was produced during the test run. Temperature explorations in the charge gave a maximum value of 1020° C. at a position 6 in. inside the brick wall and 12 in. above the air inlets.

* Department of Scientific and Industrial Research. Report of Test by the Director of Fuel Research on the Maclaurin Plant Installed at Dalmarnock Gas-Works, Glasgow. H.M. Stationery Office, Adastral House, Kingsway, W.C. 2; price 9d. net.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Pressure Thrown by Waterless Holders.

SIR,—In reply to "Curious," we suggest that your correspondent may best satisfy his curiosity by inspecting one of our waterless gasholders, or obtaining a pressure chart relating to same. We shall be happy to give him the requisite introduction. He will thus obtain figures based upon actual practice as distinct from theoretical deductions.

S. LANGFORD.

Waterless Gasholder Company, Ltd.,
13, Rood Lane, E.C. 3.
June 29, 1929.

Recommendations of the Special (Burst Mains) Committee of the Surveyors' Institute.

SIR,—In your issue for June 19 you note that the recommendation of the Special (Burst Mains) Committee of the Surveyors' Institute regarding adequate ventilation of the sub-soil was forestalled in the "JOURNAL" of May 1. Might I venture to call attention to what is possibly a still more striking instance of a like nature? In October, 1928, you published a series of articles by Mr. R. W. Edwards (Chairman and Managing Director of the Aldershot Gas, Water and District Lighting Company, and Chairman of the Gas Companies' Protection Association) entitled "The Gas Industry and Highway Problems." It seems to me that the report of the said Special Committee teems with passages which recall Mr. Edwards's articles, from which I select the following passages more or less at random:

(*a*) The introduction of the mechanically propelled vehicle and the vast increase in road-borne transport of which it has been the cause have necessitated methods of road construction which in crowded centres of population have imposed upon underground pipes and services a strain they were never constructed to bear.

(*b*) In spite of continually improving methods of detecting and preventing leakage from gas mains, the presence in one form or another of gas below ground in all urban centres must be accepted as a usual condition.

(*c*) The close development of central areas, the disappearance of unpaved and open forecourts, and the creation of impervious road surfaces have removed outlets of escape which formerly permitted diffusion of these gases in small quantities at innumerable points.

(*d*) While the concentration of gases at fewer points makes detection in the end more certain, the risks arising from such accumulations are seriously increased, and detection made more imperative than before. Nor must it be overlooked that under present-day conditions leakages are more difficult, as well as more costly, to locate.

The exposition of the situation is similar in Mr. Edwards's articles and in the Surveyors' report. Where divergence occurs is in respect of the remedy or remedies for that situation. While the recommendations of the Special Committee are interesting, and afford food for thought, there can be little doubt but that certain of them will not appeal to the gas industry; for, while the tone throughout is scrupulously impartial, there is a tendency towards arbitrariness. Again, the carrying-out of these recommendations would be involved and expensive; and, I venture to suggest, even then the situation would not be adequately dealt with. The suggestion put forward by Mr. Edwards was that in the construction of new roads and, wherever possible, in the re-construction of old, adequate provision should be made in the footways and grass verges for mains and cables, while in centres of population subway accommodation should be made. This view has also been expressed by Sir Henry Maybury—well entitled to speak on a question of road construction—and by the late Lord Montagu of Beaulieu, who was equally well qualified to voice the sentiments of the road user. To those who criticize this suggestion as idealistic and impracticable, I would quote the words of the former:

> Do not let us regard the provision . . . as being impracticable . . . but let us have imagination and make a commencement somewhere. It will be surprising how such a procedure will grow. Many of our improvements have developed from quite as small beginnings, and are now recognized as current practice.

NESTOR.

June 28, 1929.

REGISTER OF PATENTS.

Meters.—No. 311,358.

KIRKEWHITE ENGINEERING COMPANY, LTD., and GOLDSPINK, G. E., both of Nottingham.

No. 4189; Feb. 10, 1928.

This invention refers more particularly to meters which are adapted to run at a high speed, and are consequently of much less size than ordinary meters which are adapted to pass the same volume of gas.

According to the invention, the slide valve controlled inlet and outlet ports are disposed in the upper face of a casing which fits on the top of the cylindrical body; the whole of the distribution passages are located in the interior of this casing, and are formed by stamped sheet-metal components fitted and soldered thereto; two of the distribution passages in this casing are adapted to connect the two central outlet ports to the outlet, two are adapted to connect two of the inlet ports directly to the interior of the body, and two are adapted to connect the remaining inlet ports to the exterior of the diaphragms, through ports in the sides of the said valve casing and extensions on the end covers. The partition in the body is formed with two steps and a bearing for the central shaft; and a more convenient arrangement is provided for carrying and adjusting the diaphragm levers.

Improved diaphragm levers and means for carrying and adjusting them are provided. Improved means are adopted for securing the diaphragms and end covers in position, and also for sealing-up the latter so as to prevent unauthorized access to the interior of the meter.

These and other features are fully explained and illustrated in the complete specification.

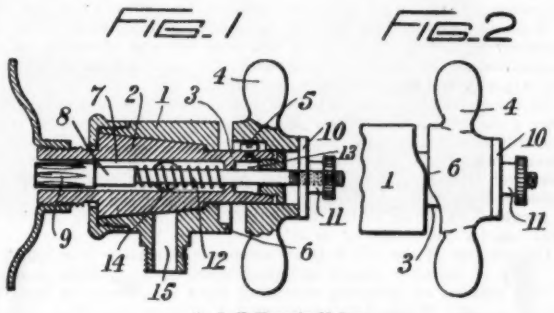
Valves.—No. 311,864.

FALKNER, A. J., of Dunmow.

No. 7375; March 9, 1928.

The valve which is covered by this specification is shown in fig. 1, a vertical cross sectional view of one form in the "off" position, and fig. 2, a side view of the end part of the same valve.

The body part 1 contains a rotatable plug 2 which extends beyond the body part at 3 and has a handle 4 arranged there-around in relatively slidable but non-rotatable relation due to a screw and slot 5; the adjacent faces of the body part and the handle being oppositely cam-shaped at 6. The plug has a bore 7 within which is arranged an injector rod 8 terminating at one end in a cylindrical part having grooves 9 in it which increase in effective size towards their middle, and in a screw-thread at the other end which permits of the rod being adjusted and extends beyond the right-hand face of the handle 4 and is provided with a washer 10 and a binding nut 11. A spring 12 between shoulders on the rod and the plug act to keep the washer in close contact with the right-hand face of the handle. A stuffing box 13 is provided for the rod.



A. J. Falkner's Valve.

By turning the handle the effective size of the injector and inlet passages are simultaneously increased; the injector being varied by the larger parts of the grooves 8 becoming exposed due to the action of the spring 12 and to the cam faces 6 riding down each other, and the inlet passage being varied by a port 14 in the plug which is gradually brought wholly into register with an inlet 15 in the body 1. Upon turning the handle back to the "off" position the opposite actions take place.

There is also described a modification in which the injector rod and plug are located in different parts of the valve body.

Ovens.—No. 311,962.

PARKINSON STOVE COMPANY, LTD., and GIBB, D. M., both of Stechford.

No. 17,389; June 15, 1928.

This invention relates to gas heated ovens, and particularly domestic and like cooking ovens of the kind in which the oven is provided

with upper and lower outlets through which the combustion products can pass away, and a damper is employed for controlling the upper outlet.

The object is to provide for the automatic control of the upper outlet; and for this purpose the invention comprises the combination with the upper outlet of a thermostatically controlled valve which closes automatically when the oven interior has reached a predetermined temperature.

Dry Cooling of Coke.—No. 312,033.

SULZER FRERES STE. ANYE., of Winterthur.

No. 26,606; Sept. 17, 1928. Convention date, May 18, 1928.

According to this invention, which is applicable to the patentees' well-known system of dry cooling of coke, the incandescent coke is charged into travelling receivers which are then, by the aid of a turntable or traverser, wheeled into separate cooling chambers arranged adjacent to one another and each adapted to contain one receiver; each chamber having conduits in or adjacent to its inner walls through which the cooling medium circulates.

Distillation of Tar, &c.—No. 312,722.

DAVIDSON, W. B., MICHIE, A. C., and MUDDIMAN, E. W., all of Newcastle-on-Tyne.

No. 7887; March 14, 1928.

(Patent of Addition to No. 255,919, of April 1, 1925.)

This invention comprises an improvement in, or modification of, the method of distilling tar and the like as claimed in patent No. 255,919 [see "JOURNAL," Vol. 175, p. 480], and consists in removing the residual light oil from the hot rich oil leaving the still, by passing steam or other suitable medium through the hot rich oil.

A manner of carrying out the invention is illustrated by the accompanying drawings, wherein fig. 1 is an end elevation of the apparatus shown in combination with that set forth in specification No. 255,919, and fig. 2 is a side elevation.

In these drawings *a* is a primary still which consists of a steam inlet 5 connected to a steam chamber 6 from which extend across the still a series of downwardly inclined pipes 7. The ends 7*a* of these pipes extend downwards to just below the level 8 of the heavy oils, and then return as horizontal pipes 7*b* to a return steam or condensed steam outlet chamber 9. At the top of the primary still *a* is provided an outlet 10 for the light vapours, and at the bottom an inlet 10*a* for the crude tar or oil.

On the side of the still *a* is an annexe or extension *b* in which is a series of suitably spaced stripping trays 2, 3, 4, each provided with a number of upwardly extending pipes 11 covered by bubbling hoods 12. The upper tray 4 receives hot oil from the still *a* through a pipe 13, and the overflow from this tray passes down a pipe 14 to the next tray 3, from there down a pipe 15 to the tray 2, and finally through a pipe 16 to the bottom of the annexe or extension *b*. In the lower portion of *b* is a steam pipe 17 having a series of perforations from which escape steam jets 17*a*, the hot oil being kept at a constant level above the steam pipe 17 by means of an outlet pipe 18 in a chamber 18*a* communicating with the oil space in the annexe *b*.

In operation the wash oil containing light oils in solution (so called rich oil) is fed to the primary still *a* in which the removal of any water in the oil takes place, together with the removal of a portion of the light oil—that is, constituents of lower boiling point. The hot rich oil leaving *a* passes through the pipe 13 into the annexe *b* and over the trays 2, 3, and 4 whereby it is subjected to a bubbling or scrubbing action of steam passing upwards from the jets 17*a* and through the bubbling hoods 12, and thereby removing light oil and vapours from the annexe *b*. These pass through an aperture 19 into the primary still *a* at a position above the level of the oil therein and below the upper steam pipes 7. By this arrangement any froth occurring in the annexe *b* is broken up when passing the tubes 7, and is thereby prevented from passing into and contaminating the distillate, which leaves the still *a* by the exit 10.

By providing suitable by-pass connections between the main still *a* and the annexe *b*, the whole unit may be used to work either as a still only or for the additional purposes above described. Where it is desired to control the quantity and quality of light oil distillate from frothing oils, the present invention affords a means of continuously effecting such operation. When working with oils which are liable to decompose with evolution of corrosive vapours, the present invention renders possible the construction of a plant wherein corrosion of the metal parts is reduced to a minimum; and in parts where corrosion is likely to occur, such parts can readily be made accessible and may be protected.

Meters.—No. 312,744.

KIRKEWHITE ENGINEERING COMPANY, LTD., and GOLDSPINK, G. E. both of Nottingham.

No. 9212; March 27, 1928.

The object of this invention is to adapt meters to run at a higher speed, and thus pass considerably more gas than those of the same size of normal construction. To obtain this result, the motion work is better supported and the frictional resistance is reduced, while the gas passages are arranged to avoid checks to the smooth passage of the gas; both features being essential, say the patentees, in order to produce the result described.

According to the invention, bearings are provided for the upper ends of the two rocking shafts, which are connected by arms or what are termed "flags" to the diaphragm; a free-running gas-tight joint is provided where the said shafts pass through the horizontal partition which separates the diaphragm chamber from the crank and link motion work compartment; and the inlet and out-

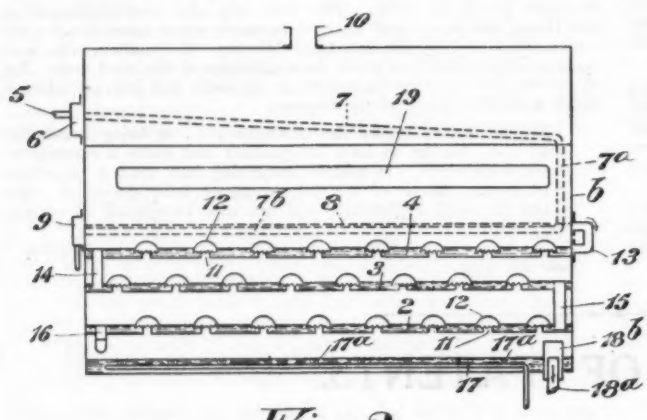


Fig. 2.

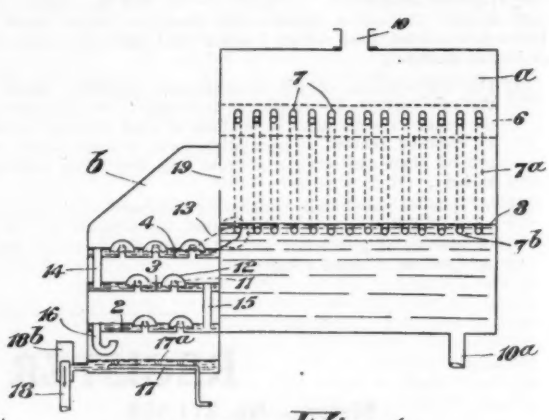


Fig. 1.

TAR DISTILLATION PLANT.—DAVIDSON, MICHIE, AND MUDDIMAN.

let connections are modified in order to prevent the flow of gas from being checked at these points.

These modifications are fully described and illustrated in the complete specification.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for June 19.]

Nos. 17,707—18,520.

CLARK, J. G.—"Gas or oil heating appliances." No. 17,941.
COX, F. J.—"Gas stoves." No. 18,367.
GAS LIGHT AND COKE COMPANY.—"Recovery of ammonia from coal gas." No. 17,914.
GAS LIGHT AND COKE COMPANY.—See Clark, J. G. No. 17,941.
HOLLINGS, H.—See Gas Light and Coke Company. No. 17,914.
HUTCHISON, W. K.—See Gas Light and Coke Company. No. 17,914.
MASTERMAN, C. A.—See Clark, J. G. No. 17,941.
METROPOLITAN FUEL COMPANY, LTD.—See Cox, F. J. No. 18,367.
PEXTON, S.—See Gas Light and Coke Company. No. 17,914.

PARLIAMENTARY INTELLIGENCE.

[From Our Special Correspondents.]

HOUSE OF COMMONS.

Plans have been deposited in accordance with section 10 of the Gas Regulation Act, 1920, in connection with the following Special Orders: Wellington (Salop), Swaffham, Houghton-le-Spring and District.

Among the Private Bills carried forward from the previous Session is the Romford Gas Bill, which has passed all its stages in the Lords, and has been read the first time in the Commons and referred to the Examiners.

Here is the Specification of the Fully-Enamelled Cooker

Grey Enamel—Fixed Crownplate, Door Frame, *Exterior Back* and Base.

White Enamel—Front Frame, Latch, Bridges, Cornice, Loose Crownplate, Stand, Door Panel, Exterior Sides and Backplate.

Black Enamel—Inner Crownplate, Hot-plate Bars and Burner Supports.

Taps—STAINLESS Hot-stamped.

Door Handle—Non-conducting Bakelite.

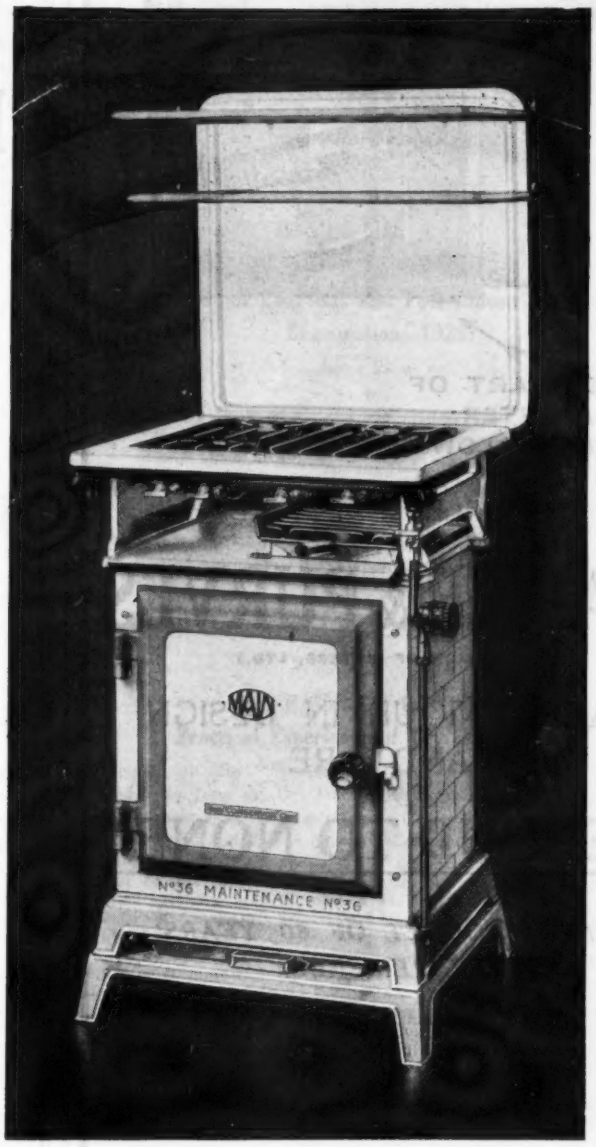
Grill Pan—Grey Enamelled.

Oven Linings and Oven Fittings—Grey Mottle Enamelled.

Plate Rack—Copings Nickel-plated.

The CONSERVOR Oven, because of its two burners, will bake perfectly on the bottom or top shelves. It has a "factor of safety" of about 300%, or with its principal flue completely closed up, its auxiliary flues ensure a "factor of safety" of 100%.

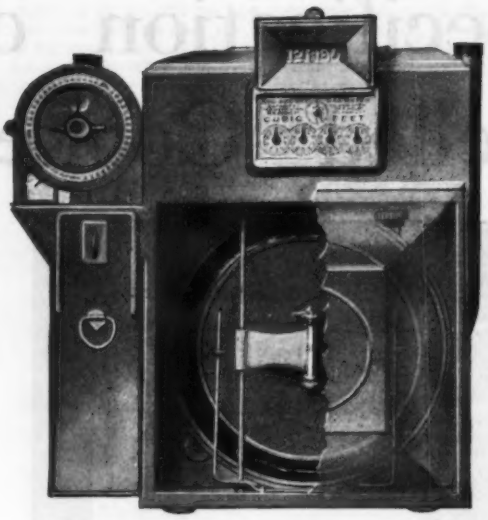
The MAINSTAT Control (available only on Main Cookers) is a precision job with metal-to-metal contact throughout. There are no washers or "packing" to wear and cause leakage. Its construction is such that its *settings remain constant* indefinitely. Therefore prolonged use will not subject it to any drop in temperature from its original adjustment.



Deluxe Mainamel

The one and only Cooker of its class

R. & A. MAIN, LIMITED, LONDON AND FALKIRK



THE HEART OF
A METER
IS THE BELLOWS.

THE BELLOWS FITTED BY

SAWER & PURVES

(BRANCH OF METERS, LTD.)

ARE UNIQUE IN DESIGN
AND ARE

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THE PRODUCT OF 60 YEARS' EXPERIENCE.

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Sawer, Nottingham.
Metrique, Lamb, London

TELEPHONE:
Manchester 3289 City.
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The Simmance Patent

DEAD-BEAT INDICATOR

Any range from 0-1" w.g.vac. or press.;
or ·5"-0-·5" combination — in 1/100".

—can be supplied in portable form for making accurate and instant tests of draught and pressure in various parts of the retort bed or boiler setting. No liquid is used, and the attachment can be made with the greatest facility, whilst the pointer shows smaller changes of draught or pressure than are perceptible with any other form of indicator.

"Dead Beat" Instruments are made solely by:

ALEXANDER WRIGHT & CO.

LIMITED

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Victoria Street, WESTMINSTER, S.W. 1

'Phone: Victoria 1207.
Telegrams: "Precision, Sowest, London."

MISCELLANEOUS NEWS.

MANCHESTER CHIEF ENGINEERSHIP.

No New Applicants at the Higher Salary.

The following statement, extracted from last Thursday's "Manchester Guardian," reveals a curious position in connection with the efforts of the Manchester City Council to obtain a Chief Engineer for their gas undertaking:

The question of the appointment of a responsible Engineer for the Manchester Corporation gas undertaking was again considered at a meeting of the Gas Committee yesterday. No official announcement was made at the close of the meeting; but it is understood that the Committee decided to refer the matter to the Establishment Committee, with a recommendation that the City Council should be asked to rescind the resolution it passed instructing the Committee to appoint an Engineer at a salary of £2250.

It will be recalled that the decision of the Council was arrived at after the failure of the Committee to recommend the appointment of any of the applicants for the post when it was advertised at a salary of £1500. The attitude now adopted by the Committee, it is explained, is due to the fact that the short list of applicants which has been prepared contains the name of no candidate who was not prepared to accept the position at the original salary of £1500.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDERS.

Houghton-le-Spring District Gas Company.

To extend the limits for the supply of gas; to sanction the acquisition by the Company of the mains, pipes, and other gas plant of the Lambton Hetton and Joicey Collieries, Ltd., within the extended limits; to authorize the use of scheduled lands for gas purposes; to empower the Company to raise additional capital; and for other purposes.

Swaffham Gas Light and Coke Company.

To authorize the use of scheduled lands for gas purposes; to make further financial provisions, &c.

GAS REGULATION ACT ORDERS.

Section 6 (Act of 1929).

In addition to the two Orders, relating to the Ardrossan Corporation and the Buckhaven and Leven Gas Commissioners, already notified in the "JOURNAL," the Board of Trade have made the following further Orders under section 6 of the Gas Undertakings Act, 1929:

Elsecar, Wentworth, and Hoyland Gas Company.

The Company shall from Jan. 1, 1930, charge according to the number of British thermal units supplied, and shall on or before Oct. 1 give notice of the calorific value of the gas which they intend to supply.

Forfar Corporation.

The Corporation shall from April 1, 1930, charge according to the number of British thermal units supplied, and shall on or before Jan. 1 give notice of the calorific value of the gas which they intend to supply.

Largs Corporation.

The Corporation shall from Nov. 12, 1929, charge according to the number of British thermal units supplied, and shall on or before Aug. 12 give notice of the calorific value of the gas which they intend to supply.

Peterhead Corporation.

The Corporation shall from Nov. 12, 1929, charge according to the number of British thermal units supplied, and shall on or before Aug. 12 give notice of the calorific value of the gas which they intend to supply.

Bradford's Travelling Showroom.—The Bradford Corporation Gas Committee have received delivery of their travelling showroom, based on the showroom which the York Gas Company have found so successful, and which was on view during the visit of the British Commercial Gas Association to York last year. The showroom, which in travelling can be closed up to meet ordinary road transport requirements, can be extended when standing on a temporary site to a floor area of 21 ft. square. The vehicle is equipped with all the latest domestic gas appliances, set out in attractive manner, for exhibition to the householders in all parts of the city and service district. Cookers, fires, water boilers, and lighting units will be in actual use at each site visited, and there will be a competent advisory and demonstrating staff in attendance. The first site was at Eccleshill, close to the new Harrogate Road housing estate, where the travelling showroom was formally declared open by the Lord Mayor of Bradford on July 1.

HOLBORN EXPLOSION SUFFERERS.

Agreement as to Compensation.

With regard to losses resulting from the explosion which occurred in Holborn at the end of last year, the following announcement has been made by the Postmaster-General and the Gas Light and Coke Company:

While disclaiming any legal liability on their respective parts for the explosion which occurred in Holborn on Dec. 20 last, the Postmaster-General and the Gas Light and Coke Company have come to an agreement under which they will pay, in equal shares, proper compensation to persons who have suffered loss from the explosion which would have been legally recoverable if the liability of the Postmaster-General and the Gas Light and Coke Company for the explosion had been established—provided claims are sent in promptly.

Claims giving detailed particulars of the loss sustained, supported by vouchers, should be forwarded forthwith to the Solicitor to the Post Office, General Post Office, E.C. 1.

UNIVERSITY OF LEEDS.

Department of Coal Gas and Fuel Industries. Degree Examination, 1929.

Ph.D.—F. J. Dent, B.Sc., for a thesis on "Factors Influencing the Reactivity of Coke."

M.Sc.—C. P. Finn, B.Sc.; J. H. Dyde, B.Sc., for a thesis on "Further Experiments on the Behaviour of Carbonized Fuels in the Open Grate."

B.Sc. (Honours)).—Class I.; A. H. Eastwood, B.Sc., for a thesis on "Some Observations on the Effect of the Ash Constituents of Coal on the Evolution of Nitrogen as Ammonia during Carbonization;" S. Kellett, B.Sc., for a thesis on "Oxidation of Ammonium Salts Containing Sulphur."

B.Sc. (Ordinary).—K. G. Bodiley; C. B. Bolland (Corbet Woodall Scholar); G. Milner; A. Taylor.

IN PRAISE OF GAS COKE.

Practical Experience of Dr. Harold Kerr.

Writing on the "Wealth Lost in Smoke," in the "Evening World" for June 22, Dr. Harold Kerr explains how gas coke can help to solve the smoke problem. Ordinary coke as produced by gas-works, he states, is a most excellent fuel, but the housewife has found it hard to light. The writer discarded raw coal as a fuel in favour of gas coke nuts some six or eight months ago. He substituted special grates, fitted with gas burners below them, at a cost of between £2 and £3 apiece, which was the only initial expense.

The fire is laid in the morning simply by emptying the grate of ashes and cinders, pouring in some coke, and lighting the gas below for 15 or 20 minutes. By that time the coke is well alight, and very soon the entire contents of the grate are bright red, so that the heat thrown out is twice as strong as from a coal fire, with its patches of blackness. There have been no fumes or smell, there is no smoke, the rooms have been really warm, and the coke is clean to handle. There is, perhaps, a trifle more dust, but nothing to speak of, and the verdict of the household is—"No more coal for us!"

Comparative costs, states Dr. Kerr, are scarcely available yet, but so far as an opinion can be formed at present, the gas bills are working out about the same, in spite of a somewhat lavish use of the starter-gas, while the bill for coke is about one-eighth less than was that for coal.

Barry Gas Profits.—A satisfactory surplus on the gas undertaking was reported to the Gas and Water Committee of the Barry Council on June 24. Mr. C. B. Griffiths said that where they had estimated a profit of £4000 upon the gas undertaking for the year ended March 31 last, the profit actually amounted to £6689. It was decided to recommend the Council that the profit on the gas undertaking be transferred to the Treasurer's balance.

Dearer Gas in Dundee.—In the Departmental accounts which were issued by the Dundee City Chamberlain on June 21, it was announced that the charge for gas in Dundee is to be increased from 3s. to 3s. 4d. per 1000 c.ft. The Gas Department began the year with a deficiency from the previous year of £8604, and, mainly on account of the revenue from the sale of residuals not reaching expectations, the deficiency has increased to £24,432. By the estimate for the current year the Department anticipate reducing the debt to £3000. The increase affects both domestic and industrial consumers, the charge against the latter being raised from 2s. 9d. to 3s. 1d., with certain percentage deductions. The residents of Invergowrie, representatives of whom recently protested against the charges, are not immune from the additional charge of 4d., their rate going up from 4s. to 4s. 4d.

PRIMITIVA GAS COMPANY OF BUENOS AIRES, LTD.

A Return to the Dividend Paying Stage.

The Twenty-Eighth Annual Ordinary General Meeting of the Company was held on Tuesday, June 25, at River Plate House, Finsbury Circus, London, E.C.—Mr. P. A. Cooper (the Chairman) presiding.

The Secretary (Mr. Robert Grant) read the notice convening the meeting and the certificate of the Auditors; and the report of the Directors and the statements of accounts for the year ended Dec. 31 were taken as read.

Salient Figures from the Accounts.

The Chairman, in the course of his remarks upon the report and accounts, said: When I addressed you for the first time just four years ago, I said you would have to exercise patience before you could expect to receive a dividend. Our affairs were indeed in a gloomy condition. We had been called in to take over the management of your Company, and we had to exercise all our enthusiasm and all our determination to get it going again. I believe there were few who, knowing the real state of affairs, would then have foretold a dividend for this year. It is therefore with real pleasure that we are able to recommend a dividend to-day. It is a modest one, and you can see that it might have been a bigger one. But when you consider that the result of our conservative policy has been to bring the Company from penury to strength in so short a time, I am sure you will agree with our modest proposal.

Last year I had to point out that the figures in our revenue account were not useful to you for comparison. We consider that they are of no real value, and might be actually misleading. We have therefore decided to omit that account. If you will turn to the other accounts, you will find some very satisfactory figures. The first item of "land, buildings, plant, &c.," has been increased, after allowing for sundry adjustments, by an amount of no less than £343,000—a much bigger increase than has ever before been added in one year. "Sundry debtors" is up by £92,000, due to expansion of our own business and that of the Provincial Company. Investments, which are up by £47,000, now include our shareholding in the Provincial Gas Company. On the other side you will see that our share capital is increased by £5000—part payment for the Provincial Gas Company. Our various debentures are reduced by no less than £71,000, and, since the close of the accounts, by a further £44,000. Creditors and loans are up by £144,000, which is accounted for by a sum owing on land purchases and largely increased business. Including the allocations for this year, the various reserve funds and carry-forward amount to the large total of £776,000; and this figure, as I have told you before, is arrived at after writing off every doubtful item we have come across.

The balance from revenue account is up by £73,000 at £287,000. In spite of an increased sinking fund allocation, the balance on profit and loss account is better by £71,000. After providing what we believe to be a full allowance, we are left with £93,000 for dividend; and the carry-forward is increased by £43,000. You have seen in the balance-sheet that, due to the rapid increase in our business, which has entailed heavy expenditure for land, plant, and stores, our current liabilities have mounted up. We anticipated this last year when we asked you to increase the capital; and, as I will explain to you in a few moments, we have made provision for ample funds to carry on for at least a couple of years.

Rapid Progress of Business.

Our business has progressed even more rapidly than last year, and the first three months of 1929 show that this progress is maintained. We have continued to overhaul and improve our plant and personnel. We are doing our utmost to bring every section of the business up to the highest standard. As I have explained before, we are overtaking years of arrears of work, and moreover we are working on our development plans and laying foundations for future expansion. All this entails heavy expenditure, the full return from which you will reap in the years to come.

This year we have made important purchases of land, which will enable us largely to increase our production. Moreover, we have carried out extensions to our mains which, while still on a very moderate scale, represent the commencement of a programme which, before long, will develop into a very big one. Our Provincial Company, while still a small affair, is making progress.

You will be gratified to learn that the strenuous work of reorganization is showing results in many directions. We have again slightly lowered the price of gas. Unaccounted-for gas is materially less, and the volume of complaints, or adjustments, as I prefer to call them, has fallen. We are glad to record, too, that the control by the management—statistical and chemical—is improving satisfactorily.

The public in Buenos Aires now appreciates our service, and a most gratifying development during the year has been the increasing interest which architects and builders have shown in gas. We expect that before long there will not be a single one of them who will not insist on gas as a necessity in every city house. During the year more than one important retail store has offered its services and co-operation in the sale of gas appliances.

Our industrial department, while it has made progress, has not improved to the extent we would have wished. This is due to our difficulty in getting the men we need. We are tackling this, and we are satisfied that we will solve the problem. There is a great field of work in this direction, and we intend to develop it. We are fully aware of our deficiencies; but, as you see, we are rectifying them as rapidly as we can. Our efforts have been, and are, continually directed towards an improvement in management and the elimination of waste in every direction. The maintenance of efficiency is a continuous process. It means keeping abreast with modern technical developments and improvements in management, with the twofold object of increasing our business and improving the services that we render to our consumers. This is our objective, and can only be carried out with the whole-hearted enthusiasm and ability of our Managers and Staff, as well as of your Board in London. It is not directly our business to-day to consider efficiency in England, but in fact it affects this Company closely. We are proud of the contribution we make towards the relief of unemployment. We calculate that to-day we are giving employment to more than twice as many men in England as we were doing this time last year. This increase, of course, is due to the progress made by our business; and we expect that it will improve steadily.

The United States is our great competitor, and is, in ever-increasing degree, taking the lead as "big traders" in South America; and their continued purchase of South American public utilities accentuates this position in a marked degree. The reasons given are our indebtedness to, and the superfluous wealth of, the United States; but the energy and organization that our rivals are bringing to bear in this field must not be overlooked. The pressure of economic circumstances seems to be heavily against us. Be that as it may, it seems to me that our task is to continue the management of the affairs of the Company with vigorous enthusiasm and energy, knowing that by so doing we will bring our shareholders back to a position better than they have ever occupied in the past, and will find employment for increasing numbers of our own workpeople in this country.

From the figures before you, and from what I have told you, you can judge that our management and staffs continue to show enterprise and energy. There is a feeling of intense, but perfectly justified, optimism throughout the whole organization. Our staffs are proud of the business, and they have every reason to be so. They have plant and equipment which already compares favourably with anything of its kind, and their technical efficiency is steadily rising. While they are by no means satisfied, they feel the pleasure of steady improvement and success. Only those of us who have seen this business emerging from its troubles can appreciate fully what our people are achieving. As Chairman of the Company, in the closest daily contact with its activities, I am proud to be associated with them. Their's is a remarkable record, and we here owe them our sincere appreciation and thanks. I am going again this summer to Buenos Aires to study our affairs on the spot with the Local Committee and Management, and I hope I may convey to them your congratulations and thanks for their successful efforts on your behalf.

We have recently appointed Mr. Wilfred Howard-Williams to a seat on the Board, and you will be asked to confirm his election. Mr. Howard-Williams, as you know, had a successful period in Buenos Aires as General Manager of the Central Argentine Railway. He is now on the Board of that Railway and other important concerns. His intimate knowledge of the Argentine is of great value to us.

Arrangement with the Buenos Aires Electric Light and Power Company.

I will now turn to a matter of the greatest importance to the Company. In our report we briefly referred to an arrangement we have made with the "C.H.A.D.E.," which, as you know, is the Company which supplies electric light and power to Buenos Aires, and is one of the group of Companies controlled by that powerful Corporation with world-wide interests known as "Sofina" (Société Financière de Transports et d'Entreprises Industrielles). Owing to the intricate nature of the agreement, we thought it wiser to leave the publication of the details until I addressed you to-day. You know that for a year or more we have been trying to find a method of co-operating with the "C.H.A.D.E." and at the same time maintaining for our shareholders the very valuable potentialities of the future. I have told you from the first that you have a property of very great possibilities. We have greater confidence in the truth of that to-day than ever before; and we are determined to keep that future for the shareholders. You have suffered great losses. You have made great sacrifices. But there are great benefits in the future; and we believe you will gain these more quickly working in co-operation with the "C.H.A.D.E." than in any other way. We wished the "C.H.A.D.E." to co-operate with us and use their admirable organization to help us to develop our business, and we realized that the best way of doing this was to give them a share interest in our business without, at the same time, losing for our shareholders the future equity. The "C.H.A.D.E.," on the other hand, were willing to co-operate and to take a share interest, but were not prepared to do so, and to put their backs into the job, only to find that we had sold out the control to some group which might have conflicting interests. We therefore set to work to find a means of meeting both points of view. After careful consideration, the following arrangements have been entered into:

The Primitiva Company has sold to the "C.H.A.D.E." 660,000 shares at 30s. each. We fixed the price in relation to the market price on the day when it was settled; the exact figure on that day being 30s. 4½d. Incidentally, I should say that we considered this to be a perfectly fair price, but it is much lower than we would have been prepared to sell the shares at to anyone other than the "C.H.A.D.E." who had undertaken to help us to develop our business and are in a position to carry out their promise.

A Holding Company.

The Primitiva Company has formed a Holding Company, into which the Primitiva shareholders will be asked to exchange their shares. The shares then belonging to the "C.H.A.D.E." and the Holding

Company will be held by two Trustees, whose duty will be to use their votes to maintain British control, on the one hand, and to prevent any prejudice of the interests of the "C.H.A.D.E." on the other. Otherwise they are not to interfere with the management of the Company in any way. Provision has been made for an interchange of Directors in Europe and an interchange of members of the Local Committee in Buenos Aires; and a Joint Council of Administration for developing our mutual interests is to be set up in Buenos Aires.

Owing to the fact that we have Subsidiary Companies, and that we will, before long, be forming more, it had been in the minds of the Directors to form a Holding Company, because, quite apart from the present agreement, they felt that the present financial structure would soon become inadequate for the business, and the formation of such a Company would allow them to put into force the plans they had in mind, and would allow the various Subsidiary Companies and Branches to be re-organized on a more efficient and remunerative basis.

It is proposed that the capital of the Holding Company, after the exchange is complete, should be split into 60 p.ct. 5 p.ct. preference stock and 40 p.ct. ordinary stock carrying the equity; and provision has been made in the Articles of Association to maintain British control. When the exchange is complete, you will be shareholders in a Company capable of rapid development with the use of cheap capital. You will be in a partnership with one of the most efficient organizations in Buenos Aires, and the Primitiva Company will have in its coffers almost a million pounds of very cheap money, and a business with the finest possibilities in any public utility company I know.

If the development of the "C.H.A.D.E." is any criterion on which to judge the future of our Company, you will see for yourselves that you are on the threshold of a period of great development of service and prosperity. I place the word "service" first, for I wish to say clearly to you, and to the public in Buenos Aires, that we regard this as a great public service. Its first object must be its duty to the public to give an efficient service; and if we can give that service, prosperity is bound to follow. We hope that the result of these proposals of ours will be to stop the speculation and violent fluctuations in the price of our shares, which we regard as nothing but bad. Ever since we were elected to administer your affairs, we have been trying, and succeeding, to gain the confidence of the public authorities and the people in Buenos Aires; and I would like to make as public as possible, both here and in Argentina, the statement that we greatly deprecate speculation in our shares.

An Unprecedented Recovery.

We regard it as our business to protect the interests of two parties —the public in Buenos Aires and our shareholders. And I am sure that both the people in Buenos Aires and our own shareholders will recognize that in the last few years we have made truly remarkable progress in our efforts to bring about a high state of efficiency in our operations, and a rapid return to prosperity in our finances.

The history of this Company is divided into periods. So far as this Board is concerned, we are entering the second period. The first period has been one of re-organization, of endeavour to produce order out of chaos, and of making the business strong enough and progressive enough to make it desirable for such an organization as the "C.H.A.D.E." to go into partnership with us. The second period—the one in which we are entering now—is one of partnership in which the development of our business will go on with the co-operation of another great public service in Buenos Aires.

Now you have the whole story. You remember the position of a few years ago and the progress of the first period. We can claim a recovery probably unprecedented in the history of public service companies. If you have confidence in us, you will follow our advice; and then the second period will be no less satisfactory to you than the first.

The Dividend.

In conclusion, the Chairman moved:

> "That the Directors' report and accounts for the year 1928, as now submitted, be, and they are hereby, received and adopted, and that a dividend of one shilling per share (being 5 p.ct.), less income-tax, be paid on the ordinary shares of the Company in respect of the year."

Col. H. Le Roy-Lewis, C.B., C.M.G., D.S.O., formally seconded the motion.

Several shareholders spoke in terms of highest praise of the results secured by the Board and officials, and in reply to one question,

The Chairman said: There is not so much competition in gas and electricity in Buenos Aires as some people imagine. In my view, every modern city house should be equipped with three things—water, gas, and electricity. I regard gas and electricity as complementary, rather than competitive. But where they are competitive, they must compete. When the spirit of competition dies, progress dies with it.

The resolution for the adoption of the report and accounts and the payment of the dividend was unanimously carried; and the subsequent formal business was brought to a close by a hearty vote of thanks to the Chairman, Directors, and officials in London and the Argentine.

SOUTH METROPOLITAN GAS COMPANY'S CO-PARTNERSHIP.

Address by Dr. Charles Carpenter.

Last Saturday afternoon the South Metropolitan Gas Company held their annual co-partnership festival at the Crystal Palace. As usual the afternoon was devoted to a sports programme. Mr. A. Coleman acted as Organizing Secretary; Mr. F. Day officiated as Referee on the sports ground; and Mr. C. Walker was the Referee of the events on the boating lake. There was community singing under the direction of Mr. Walter Reynolds, and at seven o'clock the President of the Company, Dr. Charles Carpenter, C.B.E., delivered the following address.

THE ADDRESS.

It gives me great pleasure to voice again the sentiments of the Directors of the South Metropolitan Gas Company in welcoming you to this festival, commemorative of the fortieth year of our co-partnership. Great though that pleasure is, it is mingled with regret when I reflect that my almost life-long friend, my ever-devoted colleague, and one of the sincerest upholders of the principle of co-partnership is, by reason of a severe domestic bereavement, unable to give me his personal support this afternoon. We must all hope that the rest from over-exertion and anxiety which Mr. Frank Bush has been required by his medical adviser to take, will soon have the effect of restoring him to his normal, and his inspiring, good health.

In looking back over those forty years to which I have referred, one cannot but be conscious of the fact that critics of co-partnership, and perhaps even we ourselves, attached an undue importance to its body rather than to its soul. On the one hand, it was said that its regulations hampered the freedom of our employees, and on the other it could have been urged that the then equivalent of this very meeting was a bonus festival, and not a co-partnership festival.

I think we have travelled a long way towards rectifying these alleged defects. Taking as our motto that of "Brotherhood in Business," we have tried to construct a combination, rather than an association, of Capital and of Labour, welding in fact both forces in one unity rather than relying upon their utilization in parallel. And while not disregarding those material advantages arising out of the payment to our workpeople of a monetary bonus dependent upon profits, we have borne in mind the old saying "What is wealth without health?" We realize, in fact, that we need co-partners not only with healthy pockets, but with healthy bodies—two possessions which certainly have a share in the encouragement of healthy minds.

We have been sometimes told that with proper supervision and efficient control, we could obtain a maximum of labour effectiveness independently of any co-partnership system. It is not, of course, easy to combat such statements by definite contrary proofs. We at any rate honestly believe that our labour efficiency is the greater for co-partnership. But of one thing we are perfectly certain—that we have improved our employees' physical efficiency by the opportunities provided under co-partnership for increasing our standards of general fitness. The wear and tear of life is often attributed to industrial causes, but I am of opinion that it is much more frequently traceable to neglect of the ordinary precautions properly associated with healthy living.

Now there is another objection commonly urged against the general adoption of the co-partnership principle, and that is that its admitted success in the gas industry is not a guide as to its effectiveness when applied to other manufacturing or commercial undertakings where the whip of competition exists to stimulate efficiency. Whatever may have been the truth when our co-partnership first came into being, this is not the case to-day.

We have always had to meet competition in our sales of coke, and of tar, ammonia, and other chemicals, as well as with, in a greater or less degree, our staple product gas. But to-day we have to meet competition of an altogether different kind, and from a totally unexpected quarter. There has come over our local authorities lately a new spirit inspired, I strongly suspect, by what I will describe as a central pressure from Whitehall. The County Council and the various municipal councils are becoming large property owners in an increasing degree and on a very large scale. And they are taking up a very remarkable attitude in regard to their tenants. By their restrictive covenants they say to them in effect, "You may keep a tallow night light burning in your bedroom to quieten a restless child, but you must not use a gas light. You may go to bed yourself by candle light, but not by gas light. You may sit and enjoy your evening meal by the light of an oil lamp, but not the light of an incandescent gas burner." And all this takes place in England, and in its very heart and centre—London; in England, once called "the land of the free," but fast becoming a country where individual liberty is becoming more and more curtailed, and more and more at the mercy of officialdom. Government at one time encouraged competition as far as possible between one railway and another. To-day it prescribes amalgamation or rationalization. But in both cases the public is free when seeking the place for its pleasures, or travelling to and from its toils, to make its own choice of going either by road or rail. It has not yet been made a condition of living in a Council-owned house that the tenants should be carried to and from their work in a municipally-owned tram to the exclusion of a privately-run motor 'bus, or even by their own "shanks' pony." But undoubtedly such a condi-

tion of house tenancy will one day be imposed, and the weekly rent will not be receipted by the collector unless there is produced at the same time a set of duly punched tramcar tickets. Well, I have said enough to remind you to-day that it cannot be attributed to gas companies that they are in the position of a monopoly, or that their business is one in which they enjoy freedom from competition in endeavouring to win the favour of the light-consuming public.

There is yet another important factor with which the gas industry has to reckon; it is to-day face to face not with the rate-aided competition of the last five-and-twenty years, but with an entirely new growth—a State-aided one. Over and over again there has been laid down an entirely new test to indicate the prosperity of this country. And this is not the value of the manufactured or raw products it produces for the world's markets per unit of population, nor its financial resources, nor its savings, but how much electricity it consumes per head! And in this respect it has been found wanting because, it is stated, other nations organized under totally different conditions are larger users of that energy than ourselves. I think that at this rate the time cannot be far distant when tobacco smoking statistics will be used to prove our greater happiness compared with other lands, because on the average we smoke more pipes or consume more cigarettes.

It must be clear that we live in competitive times, and that we need all the help co-partnership can give us in order to meet the ever-increasing difficulties of the conditions with which we are faced. Notwithstanding these we have every reason to believe that the supply of gas which has for so long been one of the potent needs of civilization, will continue to play a part of ever-increasing importance in this Metropolis, where it had its birth. Our co-partnership is a true one. Let me once more liken it to that ideal State of which the great poet Milton spoke nearly three hundred years ago. His words were: "For this is not the liberty which we can hope, that no grievance ever should arise in the Commonwealth, that let no man in this world expect; but when complaints are freely heard, deeply considered, and speedily reformed, then is the utmost bound of civil liberty attained, that wise men look for."

But our co-partnership, to realize its true mission, must be something more than a machine for ventilating and remedying grievances. Our sufferings under grievance must be surely less than our privileges for usefulness.

It is among your duties to remember always that you are co-partners and members of the oldest gas co-partnership in Great Britain—and probably in the world—and the great traditions which have made this Company what it has been during something like a century of existence need for their maintenance a loyal and contented staff; and that I believe we have. Each and every one of you has a direct interest, shares, indeed, an equal proportion with the shareholders of the savings increased efficiency or more economical working will produce; and your Directors have no doubt that, with your goodwill and energy, the undertaking with which you are so closely associated will have as brilliant a future as it has had a glorious past.

LANCASTER GAS DEPARTMENT.

Steady Increase in Gas Sales.

Mr. George Dixon, A.M.I.C.E., Engineer and Manager of the Lancaster Corporation Gas-Works, in his annual report, states the receipts for 1928-29 were £83,832 and the expenditure £63,013, showing a gross profit of £20,819. The capital charges, income-tax, &c., were £12,563, the net profit being £8256. The debit balance carried forward last year of £1702 caused by the coal strike has been liquidated out of this year's profit, leaving the net balance £6554. The cost of coal was £24,748, averaging 20s. 9·2d. per ton, against 22s. 9·28d. last year. Residuals realized £13,521, equivalent to 54·6 p.ct. of the total cost of coal, against 66 p.ct. last year.

The average price of gas received per 1000 c.ft. was 3s. 0·91d., excluding public lamps. This had been expended as follows: Net cost of manufacture and distribution of gas, 1s. 9·68d.; new mains and services, 0·77d.; income-tax, 1·83d.; interest on stock and mortgages, 3·21d.; redemption (*less* unemployment grant), 3·64d.; 1926 coal strike arrears, 1·17d.; and net profit, 4·61d. The unaccounted-for gas amounted to 5·8 p.ct.

Residuals.

On the residual account the return from coke and tar amounted to £13,521, against £19,401. Fortunately, the loss was balanced by more favourable coal contracts and the better results of the new plant.

With the increasing production of gas coke and serious competition from the coke-oven coke, the question of the disposal of the product becomes more difficult each year. "We are, however," adds Mr. Dixon, "producing a better fuel for domestic purposes, and it is essential that an intensive propaganda scheme should be started in the district to bring this new smokeless fuel before the notice of the public. The use of the coke and coke breeze by the industrial users of Lancaster will do much to assist in the abolition of the present smoke nuisance."

The sales of gas show a steady increase each year, and the distribution department are in personal touch with the consumers, who appreciate the service of the maintenance inspectors. The showroom sales are still satisfactory.

The reserve fund stands at £12,419, and the redemption fund amounts to £52,667, against an outstanding debt of £127,876.

INCREASED GAS SALES AT MANCHESTER.

Report Shows Smaller Net Profit.

A net profit of £202,834, as against £388,269 in the previous year, is recorded in the report of the Manchester Gas Committee for the year ended March 31 last. The comparative drop in profit may be largely accounted for by the difference in income-tax paid, which was £64,928, as against £1852, the smaller sum having been paid as a result of reduced profits following the general strike and the consequent high price of coal.

The quantity of gas sold was 7,141,047,000 c.ft., an increase of 0·96 p.ct. as compared with the previous year. The average price realized was 3s. 5·46d. per 1000 c.ft., as compared with 3s. 8·7d. The policy of supplying a suitably graded coke for domestic use has again proved successful, 420,000 bags containing 1 cwt. each having been delivered, as against 265,000 in 1928.

Having discontinued the manufacture of gas at the Gaythorn Works concurrent with the manufacture of gas at Partington in January, a tentative re-valuation has been made of the buildings and apparatus at Gaythorn, and £157,155 has been written off. The total assets of the Manchester Corporation Gas Department were estimated at £6,619,491.

BIRMINGHAM GAS DEPARTMENT.

Record Quantity of Gas Sold.

The Birmingham Gas Committee, in their annual report to the City Council, state that the capital raised has been increased during the year by £224,127 to an aggregate of £4,536,949. The capital expenditure during the year on schemes amounted to £98,188, making a total to date of £4,364,426. The total capital redeemed amounts to £1,711,848, equal to 37·73 p.ct., leaving the amount of capital outstanding £2,825,101. The total expenditure last year amounted to £2,023,196—a reduction of £138,982—the cost of manufacture, distribution, and management all being reduced. Notwithstanding these economies, however, there is a depleted income from gas sales, this being caused by the fact that in the previous year's revenue the price of gas for the first quarter of the year was 4d. per 1000 c.ft. higher than that which ruled throughout the whole of the past twelve months. The amount of gas sold constituted another record in the history of the Department, being 13,946,200,100 c.ft., or approximately 365 million c.ft. more than in 1928. This increase is equivalent to 2·62 p.ct. The most regrettable feature upon the credit side of this account is the substantial reduction in income from residual products. When presenting the accounts for the year ended March, 1928, the Committee mentioned that they anticipated a considerable reduction in revenue from tar. Unfortunately, not only has this taken place, but serious reductions have also occurred in coke and other residuals.

The gross profit is £329,379, and after providing for annuities, interest charges, and redemption of debt, the balance is £116,499. The agreed contribution to the relief of the rates is £41,200, and £75,299 has been transferred to renewals and special expenditure account, the balance of the appropriation account remaining in the balance-sheet for working capital purposes. In addition to this contribution to the general rate fund, the Committee wish to call attention to an allowance of £36,445 made in respect of public lighting within the city. This large sum is the difference between the price charged to the Public Works Department for gas for public lighting as compared with the price at which the gas would have been charged to consumers on the scale of charges approved by the Council. The Committee are of opinion that in considering the assistance given to the rate fund from the revenues of the Gas Department, this allowance for public lighting should be included.

Long-Distance Distribution.

The Gas Committee refer to the fact that a Committee has been set up by the Board of Trade to consider the possibilities of linking-up the gas supply system in this country, including the surplus quantity of gas available from coke ovens. In the first place this Committee is surveying the possibilities of such a "grid scheme" in an area from the Mersey to the Humber and from Leeds to Birmingham. This proposition has been brought into prominence lately by the extensive system of high-pressure distribution adopted in connection with coke ovens in Germany. It has, of course, to be borne in mind that the conditions operating in the two countries are totally dissimilar, but they (the Birmingham Gas Committee) welcome the impartial investigation which the Board of Trade Committee has now commenced of the possibilities of a similar scheme in this country. There are no coke oven plants near to Birmingham, and it is very doubtful whether any linking-up scheme of the kind suggested would benefit this district, but the Committee are watching the position closely, and are supplying information to the Board of Trade Committee at their request to assist them in their investigations.

Regarding the supply of gas to small houses, the Gas Committee state that there are approximately 4000 courts and terraces, comprising 16,000 to 20,000 houses, which are still without the amenities of gas. A scheme has been instituted, and under it the tenants' orders are accepted where the landlord of the premises is unwilling to pay for this work. The cost of providing the necessary house pipes in this class of property averages from £2 to £3 per house, and the Committee have made arrangements for this work, and the laying of the service pipe from the main (which is charged only at a nominal figure) to be paid for by the tenants by reducing the number of cubic feet of gas per penny through the automatic meter fixed on the premises. The charge for the actual work carried out

in connection with the fitting of the house pipes and the laying of the service is debited against the installation concerned, and until such time as the debit is cleared, the gas supplied per penny is less than the quantity stated in the standard scale. The new scheme was put into operation early in March, and the Committee are pleased to report that its success has been so phenomenal that the Department is having some difficulty in coping with the orders that are being received from tenants. Additional staff has had to be engaged to deal with the work, and all applications are being dealt with in strict rotation.

LARGELY INCREASED PROFITS AT RIPON.

Greater Carbonizing Efficiency.

The report and statement of accounts of the Ripon Gas Committee were submitted at the monthly meeting of the Council on June 24.

The excess of receipts over expenditure on the revenue account is £5430, as against £1845, being an increase of £3584 over the previous year. Adding to this figure the difference in stock and capital expenditure on mains, and deducting bank charges, gives a gross profit of £5858 in 1929, as against £2946 in 1928, being an increase of £2911. Deducting the respective amounts of interest and sinking fund, there is a net profit for this year of £3200, as against £387 in 1928, making an increased net profit of £2812.

There has been higher carbonizing efficiency during the past year, which has increased the revenue from gas by approximately £1000, with an expenditure of only 48 tons of coal more than the previous year. In 1927-28, 69,078,000 c.ft. of gas were made from 4042 tons of coal; averaging 17,088 c.ft. per ton. In 1928-29, 73,753,000 c.ft. of gas were made from 4090 tons of coal; averaging 18,032 c.ft. per ton. This is an increase of 944 c.ft. per ton of coal.

SMOKE ABATEMENT.

Coming Fusion of Two Societies.

There have been recent negotiations between the Coal Smoke Abatement Society, which has its headquarters in London, and the Smoke Abatement League of Great Britain, which has worked principally in the North of England; and the outcome was a meeting held on June 27 in the Manchester Town Hall to discuss a proposal for the amalgamation of the two bodies. The basis of discussion was a report by the representatives of the two organizations.

It was unanimously agreed that amalgamation on the lines suggested in the report should take place, and that a new Association should be formed, which should be called the National Smoke Abatement League. It was proposed that the control office of this new body should be in Manchester, and that there should be another office in London.

A meeting similar to that held in Manchester is to be held in London by the Coal Smoke Abatement Society, after which another meeting will be held to inaugurate the new League. The latter meeting will be held either in London, or in connection with the annual conference of the Smoke Abatement League of Great Britain already arranged for October next, in Buxton. Councillor W. Melland, of Manchester, is Chairman of the League.

SOUTHPORT GAS DEPARTMENT.

Annual Report.

The annual report of the Southport Corporation Gas Department, presented to the Council by Mr. John Bond, O.B.E., Engineer and Manager, was before the Town Council on Tuesday, June 25. The report shows that during the year the gas consumed in the Southport area of supply amounted to 808,179,800 c.ft., of which 20·24 p.ct. was supplied through the prepayment system. The average price received for all gas amounted to 8·43d. per therm net, which is equivalent to 3s. 3·65d. per 1000 c.ft. The net capital indebtedness at March 31, 1929, was £251,413. The gross profit for the year amounts to £52,907, and after paying interest and sinking fund charges of £34,862, there remains a net profit of £18,044. Adding to this the balance of £1829 brought forward from last year, the total amount transferred to the appropriation account is £19,874. Of this amount it is proposed to add £7500 to the working capital account, bringing this account up to £15,000. A sum of £4000 will be transferred in aid of rates; and the balance of £8374 will be carried forward to next year's accounts. The bank overdraft now stands at £34,469; last year the bank overdraft was £46,868. The outstanding accounts for gas rents, residuals, rents, &c., amount to £44,773, and the gas estate has stores in hand, including coal, oil, residuals, service pipes and mains, meters, cookers, fires, boilers, fittings, and lamps, amounting to £20,089, making a total of £64,863.

During the year prices obtained for residual products were as follows: Coke, £15,546 (compared with £19,228 for the previous year); tar, £6394 (compared with £12,879); concentrated ammonia, £349 (compared with £850). The total amount of capital spent during the year was £35,602.

The maximum and minimum makes of gas during twenty-four hours were 3,259,000 c.ft. and 1,581,000 c.ft. respectively. Of the 995,994,000 c.ft. of gas made, 753,414,000 c.ft. were sold to private consumers; 54,525,600 c.ft. were used in public lamps; and 240,200 c.ft. of gas were supplied free. The gas used at works, offices, &c., and temperature corrections absorbed 61,665,000 c.ft.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

Business has been quiet during the past week, during which Tyneside took its annual race-week holiday, with the Exchange closing every afternoon. There is still a shortage of suitable boats, and this is causing one or two weak spots. There has even been idle time in Northumberland. The market generally, however, if not quite so firm as of late, is well maintained, and quoted prices have not eased. In spite of some hesitation pending an announcement of the Government's coal policy, inquiry is still good for all periods, and, as far as Durham is concerned, prospects seem to be assured for some time ahead. It is only odd cargoes from collieries which are short of tonnage that are occasionally offering at lower prices.

Quotations for gas coal remain at the previous levels. Wear Specials, in spite of increased supplies, are firmly quoted at 17s. 6d. f.o.b., with best qualities at 16s. 6d. to 16s. 9d. Seconds are 16s. to 16s. 6d. Coking unscreened is 16s. 9d. to 17s. 3d., with demand as insistent as ever. Best bunker qualities are well supplied with orders, and demand for depôts continues strong. They are quoted at 16s. 9d. to 17s., with seconds asking 16s. to 16s. 6d. Best Northumberland screened steams are offered at 14s. 6d. to 15s.

The gas coke market is quiet, but stocks are by no means excessive, and the quotation is maintained at 21s. to 22s. f.o.b. for shipment.

YORKSHIRE AND LANCASHIRE.

The temporary suspension of the subsidy paid under the coal marketing scheme in respect of coal for export has brought business to a standstill. A reduction in the subsidy is expected, which would make it difficult for Yorkshire coal to compete with other districts and with foreign coal. No quotations were available at Hull last week-end.

At Barnsley, the quotation for best hards was 16s. 3d. per ton f.o.b. The inquiry for most classes of industrial fuel, apart from washed doubles and smalls, is steady. On prompt account quotations were about as follows:

Washed trebles, 16s. 6d.; washed doubles, 16s. to 16s. 3d.; washed singles, 15s.; washed smalls, 13s. 6d. per ton f.o.b. There is a rather better demand for furnace coke; but values remain on the basis of 20s. to 21s. per ton f.o.b.

Current figures at Sheffield are: South Yorkshire hards, 19s. 9d.; Nottinghamshire and Derbyshire hards, 19s. 9d.; washed smalls, 16s. 3d.; rough slacks, 13s. 6d. to 13s. 9d.; washed steam 18s. 9d., all f.o.b. the Humber. Furnace and foundry coke are going away steadily, and recent figures are well maintained; 20s. to 21s. f.o.b. being the ruling prices.

Gas cokes are not so strong, but are still quoted 19s. 6d. to 21s. 6d. f.o.b.

The market for industrial fuel is steady, and for the most part colliery owners are well sold forward.

MIDLANDS.

Some collieries are finding the house coal trade more difficult to keep going than it was at any time last summer. Work at the pits is very slack. Two days' output a week is as much as some of them can dispose of. Thus far, there is little inclination to buy for stacking. Consumers are not yet convinced that prices have touched minimum.

On the industrial side there is no development to re-invigorate demand. It is not the time of year when manufacturing activity is expected to gain impetus. In the direction where, rather paradoxically, business has a tendency to expand there is not much scope for the collieries to expedite the movement. More pig iron is called for; but the deadness of the coal market is the reason why the increased supplies of smelting coke are not forthcoming. Coking slacks are necessarily scarce, and, according to some calculations, the stringency is likely to increase. Furnace cokes are now fetching about 15s. 6d. a ton at ovens.

Ordinary industrial slacks are steady. The supply is equal to the demand, with practically no surplus. Fairly good rough slacks range from 5s. to 8s. 6d., specially good grades commanding rather more. The ruling prices for "D.S." nuts run between 9s. 6d. and 12s. Large sizes are worth special prices. There is a fairly regular call for these from the London market, and Warwickshire pits have sent substantial consignments.

There is recrudescence of unrest in the coalfields as to wages and conditions; but the market position has not been perceptibly affected. The action of the Central Collieries Commercial Association regarding the export subsidy has caused perplexity in the trade.

Stourbridge Gas Department Results.—The sales of gas show an increase of about 4¼ million c.ft. compared with the previous year. The building of new houses has continued to be brisk throughout the year, but the general state of trade has shown little improvement. The gas unaccounted for is practically the same as before. The revenue account shows reduced charges for raw materials, as a reduction in the price of coal was obtained. Other expenses are very similar, allowing for natural fluctuations. The income from the sale of gas is reduced by about £4500, as the price of gas for power was reduced by 6d. per 1000 c.ft. at the beginning of the year, and the lighting and prepayment rates were reduced from July 1, 1928. Coke shows a similar return, while tar was improved, but sulphate of ammonia continues to go down. The result is a gross profit of £22,697, an increase of £1176. The balance from revenue account is subject to the usual deductions for income-tax, annual instalments, expenditure on mains, services, &c. The surplus, after these deductions, is £3911, a decrease on last year of £394.

LANCASHIRE TAR DISTILLERS, LTD.

It has been decided to amalgamate the interests of several of the largest Tar Distillers in Lancashire; and for this purpose a new Company has been registered, entitled Lancashire Tar Distillers, Ltd., to acquire the goodwill and assets, so far as their tar distilling interests are concerned, of the following firms: Messrs. Hardman & Holden, Ltd., Manchester; Thos. Horrocks & Sons, Ltd., Manchester; J. E. C. Lord, Bootle, Liverpool; J. E. C. Lord (Manchester), Ltd., Weaste; North-Western Co-Operative Tar Distillers, Ltd., Cadishead.

The Lancashire Tar Distillers, Ltd., will take over the businesses mentioned as and from July 1. Central offices have been secured at Arkwright House, Parsonage Gardens, Manchester, from which offices the whole of the selling and buying policy of the new Company will be controlled. The conduct of the business will still continue to be directed by the heads of the concerns which have merged, and which have been so long associated with the tar distilling industry.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 1.

The market for pitch is firm, and it is reported that 42s. 6d. has been paid.

Creosote for export is still called 6¾d. per gallon net f.o.b.

Pure toluole is firm at about 2s. 2d. per gallon, pure benzole is 1s. 10d. to 1s. 11d. per gallon, 95/160 solvent naphtha about 1s. 5d., and pyridine bases about 4s. per gallon.

Tar Products in the Provinces.

July 1.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 25s. Pitch—East Coast, 38s. to 39s. f.o.b. West Coast—Manchester, 32s. 6d. to 33s. 6d.; Liverpool, 34s. 6d. to 36s.; Clyde, 34s. 6d. to 36s. Toluole, naked, North, 1s. 7¼d. to 1s. 8½d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 3¾d. to 1s. 4½d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid and salty, 3⅜d. to 3⅝d.; low gravity, 2⅝d. to 2¾d.; Scotland, 3⅝d. to 3⅞d. Heavy oils, in bulk, North, 5½d. to 6d. Carbolic acid, 60's, 2s. to 2s. 0¼d. prompt. Naphthalene, £13 to £15. Salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Sulphate of Ammonia Selling Prices.

Nitram, Ltd., announce that the home prices and conditions of sale for sulphate of ammonia during July will be exactly the same as those for February/June.

Benzole Prices.

The following are considered to be the market prices to-day:

	s. d.	s. d.	
Crude benzole . . .	0 10	to 0 11	per gallon at works
Motor ,, . . .	1 5	,, 1 6	,, ,, ,,
90 p.ct. ,, . . .	1 7	,, 1 8	,, ,, ,,
Pure ,, . . .	1 10	,, 1 11	,, ,, ,,

CONTRACTS OPEN.

Carburetted Water Gas Plant.

The Sedgley Urban District Council invite tenders for the supply and erection of a carburetted water gas plant. [See advert. on p. 50.]

Coal.

The Gas Committee of the Gainsborough Urban District Council invite tenders for the supply of coal. [See advert. on p. 50.]

The Malvern Urban District Council Gas Department invite tenders for the supply of gas coal. [See advert. on p. 50.]

Gasholder and Foundations.

The County Borough of Stockport invite tenders for the construction of a gasholder and foundations. [See advert. on p. 50.]

Oxide of Iron.

The City of Salford invite tenders for the supply of oxide of iron. [See advert. on p. 50.]

Pipes and Specials.

The Sedgley Urban District Council invite tenders for the supply and delivery of weldless steel gas mains and specials. [See advert. on p. 50.]

Purifiers.

The Gas Committee of the County Borough of Burnley invite tenders for the supply and erection of six cast-iron purifier boxes. [See advert. on p. 50.]

TRADE NOTES.

Settle Speakman & Co., Ltd.

All correspondence which has been formerly addressed to the firm's London Office, 90, Cannon Street, E.C. 4, should now be addressed to Messrs. Settle Speakman & Co., Ltd., Queenborough, Kent. The Offices of the Company have been enlarged at this point, and arrangements made there to deal with all correspondence.

Technical Facts About "Lux."

Bearing the general title "The Virtues of 'Lux': Trouble-Free Purification," Messrs. Thomas Duxbury & Co., of 24, Palace Chambers, Westminster, S.W. 1, have published a series of interesting booklets which will unquestionably be of great value to gas engineers in charge of either small or large undertakings. The technical standard of these booklets on "Lux" is highly to be commended; it does, in fact, mark the changed attitude between seller and buyer—that of mutual benefit. We understand that Messrs. Duxbury will forward a set of these "tabloids of technical aid," as they are so aptly termed, to engineers who apply.

Messrs. Falk, Stadelmann, & Co.'s Annual Outing.—The annual outing of the staff of Messrs. Falk, Stadelmann, & Co., took place on June 22, a party numbering some three hundred and sixty being conveyed by special train to Southend-on-Sea, where lunch was partaken of at the Palace Hotel, the Chairman of the Company, Mr. Max Falk, presiding.

French Awards for Messrs. John Wright & Co.—The Association Technique du Gaz en France have awarded Messrs. John Wright & Co., of Birmingham, four Diplomas and a prize of 2000 frs. The prize was for the "St. Vincent" radiator, and the Diplomas were for the radiator, the "Aero" fire, the "New World" cooker, and the "Eureka" ironing set.

Market Deeping Gas Company.—A very successful year's working was reported at the Annual Meeting on Thursday, June 27, of the Market Deeping (Lincs.) Gas Company. Dr. Benson presided at the meeting, and the financial statement presented by the Manager recorded a profit on the year's working of £485. A dividend of 5 p.ct. was, therefore, agreed upon.

Byers Green Coke Ovens to Re-Open.—A satisfactory agreement was arrived at on June 24 between the management of Messrs. Bolckow, Vaughan, & Co.'s Byers Green coke oven and bye-product plant and the employees, with a view to the restarting of the plant, which has been closed down for close upon two years. Previous to closing, between 70 and 80 men were employed at the plant. It is expected that a number of men will be restarted immediately to make the necessary arrangements for lighting-up and other preparations. More men will be restarted as they are required.

Unusual Gas Leakage Fatality.—A verdict of "Accidental death" was recorded by the Liverpool Coroner, on June 25, in the case of Mary Johnstone (84), of Langdale Road, Wavertree, who died from gas poisoning. George Crowther, Engineering Foreman in the Meter Department of the Liverpool Gas Company, asked by the Coroner what was his theory of the leakage of gas which was found in the house, said that he thought that the main body of ice which had formed in the meter last February had been thawed by hot cloths, but still a quantity of ice remained under the seal in the meter. When the drum had been freed it started to work, and the pressure from the drum rotated an upshaft, to which an inner tube is attached. That pressure in turn would fracture a pipe. The defect would not show itself immediately. Asked by the Coroner if he had ever known a case like this before, he replied that this was the first case in his twenty-five years' experience. Mr. F. Raleigh Batt, who appeared for the Gas Company, assured the Coroner a full investigation was being made.

A gas exhibition, which opened in the Swadlincote Town Hall on June 19, again proved a most popular event, and demonstrated the enterprise of the Gas Department in emphasizing the utility of gas as an illuminating and heating agent.

A slight outbreak of fire occurred on June 26 at the Dalkeith Gas-Works, but by the prompt action of the General Manager, Mr. James Hamilton, serious damage was averted. He had one of his hands burned. The outbreak was observed in the meter house by a watchman, and the flames rose to the roof of the building, but were soon subdued by the fire brigade.

The Bradford Corporation Gas Department are planning an attractive gas appliances display for a Cookery, Food, and Health Exhibition to be held at Olympia, Bradford, in September. Gas cookers will also be furnished to the promoters of the exhibition, on loan, for use in a series of cookery competitions for amateur cooks, children, boy scouts, and girl guides. There will be lectures and demonstrations on cooking by gas.

A sale of gas companies' stock by auction at Pudsey last week realized variable prices: £304 10 p.ct. stock in the Calverley and Horsforth Gas Company sold at £172 10s. per £100; £156 10s. 10 p.ct. stock in the Drighlington and Gildersome Gas Company realized £151 per £100; £370 7 p.ct. "B" stock of the same Company sold at £101 per £100; £70 of consolidated ordinary stock in the Harrogate Gas Company, paying 10 p.ct., sold for £102; Pudsey Gas Company stock, 10 p.ct., was withdrawn at a bid of £169 per £100; and Calverley Gas Company stock at 7 p.ct. was withdrawn at £115 per £100.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. June 28.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb 7	5	5	Aldershot 5 p.c. max. C.	70—75	..	70½
412,992	,,	,,	4	4	Do. 4 p.c. Pref.	73—76	..	..
1,551,868	,,	Apl. 11	7⅞	7⅞	Alliance & Dublin Ord.	96—99	..	96—97½
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb.	64—67	..	..
522,655	,,	Mar. 7	7	7	Barnet Ord. 7 p.c.	115—118	..	..
500,000	1	May 9	1.4½	1/4½	Bombay, Ltd.	19/—21/-	..	..
172,500	10	Mar 7	9	9	Bournemouth 5 p.c.	13—13½	..	..
500,050	10	,,	7	7	Do. B 7 p.c.	12⅜—12⅝	..	..
439,160	10	,,	6	6	Do. Pref. 6 p.c.	10⅞—11½	..	11 1/16
50,000	Stk.	Jan. 10	3	3	Do. 3 p.c. Deb.	55—58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	74—77	..	76—76½
357,900	,,	Mar. 21	7½	7½	Brighton & Hove 6 p.c. Con.	113—116	..	..
371,880	,,	,,	6½	6½	Do. 5 p.c. Con.	99—102	..	100½
1,337,500	,,	Feb. 21	5	5	Bristol 5 p.c. max.	8½—90½a	..	..
855,000	,,	Apl. 11	8	7½	British Ord.	117—120	..	118—118¾
100,000	,,	June 27	7	7	Do. 7 p.c. Pref.	112—117*	—3	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	71—74*	—2	..
200,000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	92—95*	—2	96½
150,000	10	May 30	6	8	Cape Town, Ltd.	8½—9½	..	9—9½
150,000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref.	6½—7½	..	..
150,000	Stk.	June 27	4½	4½	Do. 4½ p.c. Deb.	71—76*	—2	..
836,880	,,	Feb. 21	6	6	Cardiff Con. Ord.	97—100	..	..
937,840	,,	June 27	7½	7½	Do. 7½ p.c. Red. Deb.	99—102*	—2	..
187,150	,,	Feb 21	5	6½	Chester 5 p.c. Ord.	88—93b	..	..
98,936	1	May 9	1.2/-	1.2/-	Colombo Ltd. Ord.	35/—37/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
375,402	1	Apl. 11	1/9½	1/9½	Colonial Gas Assn. Ld. Ord	24/6—26/6	..	..
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/6—22/6	..	..
2,073,280	Stk.	Feb. 21	5	7	Commercial Ord.	97—100	..	97½—98
475,000	,,	June 13	3	3	Do 3 p.c. Deb.	56—59	..	57—57½
787,560	,,	Feb. 21	7	7	Croydon sliding scale	111—114	..	..
489,100	,,	,,	5	5	Do. max. div.	83—86	..	..
542,270	,,	Mar. 7	7	10	Derby Con.	112—117e	..	..
55,000	,,	June 27	4	4	Do. Deb.	68—71*	—1½	..
299,900	,,	Mar. 7	5	5	East Hull Ord. 5 p.c.	73—75	..	..
1,009,180	10	Mar. 21	†4	†7	European, Ltd.	17—19	..	17—17½
18,708,480	Stk.	Feb. 21	5½	5½	Gas Light & Coke 4 p.c. Ord.	19/3—19/9f	—/4½	19/3—19/9½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	63—65	..	63—63¾
4,187,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	76—78	..	76¾—78
5,601,630	,,	June 13	3	3	Do. 3 p.c. Con. Deb.	58—61	..	59½—60½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	97—100	..	99—99½
82,500	,,	Mar. 21	7	7	Hastings & St L. 5 p.c. Conv	98—103	..	..
288,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	80—85	..	..
70,000	10	Apl. 24	†10	†10	Hongkong & China, Ltd.	14—16	..	..
218,200	Stk.	Mar. 7	5½	6	Hornsey Con. 3½ p.c.	86—89	..	..
1,976,000	,,	May 30	10	21	Imperial Continental Cap.	380—380	—'0	365—385
223,180	,,	Feb. 7	3½	3½	Do. 3½ p.c. Red. Deb.	70—73	..	..
235,242	,,	Mar. 7	7½	8	Lea Bridge 6 p.c. Ord.	117—120	..	..
2,145,907	,,	Feb. 21	6½	6½	Liverpool 5 p.c. Ord.	95—96b	..	..
600,000	,,	Mar 21	7	7	Do. 7 p.c. Red. Pref.	102—104b	..	..
168,786	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap.	124—129	..	1'5—127
63,480	,,	June 27	3	3	Do. 3 p.c. Deb.	53—56*	—1	..
75,000	5	June 13	‡8	‡10	Malta & Mediterranean	5½—6	..	..
392,000	—	Apl. 2	—	5½	Metrop'tn (of Melbourne) 5½ p.c. Red. Deb.	100—102	..	..
541,920	Stk.	May 30	‡5	‡9	Montevideo, Ltd.	105—108	..	..
2,061,315	,,	Feb. 21	5	5½	Newcastle & Gateshead Con.	16/9—17/3d/f	—/6	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref.	74½—75½d	..	..
691,705	,,	June 27	8½	8½	Do. 8½ p.c. Deb.	68—69d*	—1½	..
181,780	,,	Mar. 7	7/1/0	7/1/0	North Middlesex 6 p.c. Con.	105—110	..	..
800,000	,,	Apl. 24	9	7	Oriental, Ltd.	115—120	..	..
205,162	,,	June 27	8	8	Plym'th & Ston'house 5 p.c.	110—113*	—2	..
424,416	,,	Feb. 21	7½	8½	Portsm'th Con. Stk. 4 p.c. Std.	118—119	..	..
241,446	,,	,,	5	5	Do. 5 p.c. max.	82—85	..	..
2,334,464	1	June 27	—	‡5	Primitiva Ord.	36/—38/-*	—1/-	34/6—38/1½
244,500	100	June 3	4	4	Do. 4 p.c. Red. Deb.	92—95	..	..
695,000	Stk.	Jan. 24	4	4	Do. 4 p.c. Red. Deb. 1911	79—83	..	..
416,345	,,	June 27	4	4	Do. 4 p.c. Cons. Deb.	78—81*	—1	79—80
150,000	10	Mar. 21	6	6	San Paulo 6 p.c. Pref.	8½—9	..	..
1,736,968	Stk.	Mar. 21	6½	6½	Sheffield Cons.	108—110c	—1	..
95,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb.	74—77e	..	..
90,000	10	June 13	‡4	‡4	South African	4—6	..	..
6,609,895	Stk.	Feb. 21	5	7½	South Met. Ord.	104—106	..	104—105½
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	108—111	..	109—110½
1,895,445	,,	Jan. 10	3	3	Do. 3 p.c. Deb.	58—61	—½	58½—59⅜
734,000	,,	Mar. 7	6½	6½	Do. 6½ p.c. Red. Db.	100—102	..	100⅝—101½
91,500	,,	Mar. 7	8½	8½	South Shields Con.	10⅝½—107½d	..	..
1,548,795	,,	Feb. 21	6½	6½	South Suburban Ord. 5 p.c.	107—110	..	..
468,837	,,	June 27	5	5	Do. 5 p.c. Deb.	95—98*	—2	..
647,740	,,	Mar. 7	5	5	South'mpton Ord. 5 p.c. max	77—80	..	79
121,275	,,	June 27	4	4	Do. 4 p.c. Deb.	70 73*	—2	..
179,014	,,	Feb. 21	8	8	Sutton Ord.	116—119	..	..
350,000	,,	Feb. 21	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
200,000	,,	June 27	6½	6½	Do. 6½ p.c. Red. Deb.	100—102*	—2	..
1,002,275	,,	Mar. 7	—	6⅝	Tottenham District Ord.	106—109	..	108
150,000	,,	,,	6½	6½	Do. 6½ p.c. Pref.	97—100	..	..
191,255	,,	June 13	4	4	Do. 4 p.c. Deb.	74—77	..	..
339,094	,,	Mar. 7	6⅞	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	93—98	..	..
88,880	,,	,,	5	5	Do. 5 p.c. pref.	88—93	..	90
90,000	,,	Feb. 21	8½	9	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	147—152	..	..
255,686	,,	,,	7½	7½	Do. B 5½ p.c.	125—130	..	..
482,585	,,	,,	6⅝	6⅝	Do. C and New	102—107	..	103—103½
862,000	,,	,,	£5	7½	Do. Wimbledon 5 p.c.	115—120	..	..
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c.	126—131	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref	90—95	..	..
86,415	,,	June 27	3	3	Do. 3 p.c. Deb.	54—57*	—2	..
254,743	,,	,,	4	4	Do. 4 p.c. Deb.	74—77*	—3	..
207,500	,,	,,	5	5	Do. 5 p.c. Deb.	93—96*	—4	95

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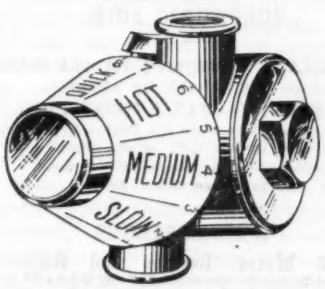

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